

Agricultural Research Institute, Pusa

The Composition of some Indian Feeding Stuffs.

BY

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CALCUTTA
SUPERINTENDENT GOVERNMENT PRINTING, INDIA
1917

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PREFACE.

THE object of this publication is to place, in a comprehensive form, before cattle-owners and those interested in the preparation of cattle food, the composition of such of the feeding stuffs available in India as have so far been analysed in the laboratory of the Imperial Agricultural Chemist. In referring to this Bulletin, one should remember that the relative production values of different feeding stuffs depend more on digestible fractions than on total amounts of nutrients and that the results of the analyses here given have not been supplemented by feeding tests but that they are intended to serve only as a general guide to the making of suitable rations.

The analyses are entered against the botanical names of the plants from which the products analysed were obtained. The English and the chief vernacular names of the plants have also been given. The nomenclature followed is that used in Sir George Watt's "Commercial Products of India." For easy reference an index is given at the end.

The figures have been checked carefully, but should any readers come across any undetected errors and kindly bring them to the notice of the undersigned, he will be very grateful.

The credit for a very large number of analyses of the food-stuffs dealt with in this book is due to Major J. W. Leather, late Imperial Agricultural Chemist. He published some of the analyses in the *Agricultural Ledgers*, No. 10 of 1901 and No. 7 of 1903. As these Ledgers are now out of print and as it will facilitate reference, most of these analyses have been incorporated in this volume. These are marked with the letter "L" in the book.

J. SEN.

The Composition of some Indian Feeding Stuffs.

[Received for publication on 20th November, 1916.]

Introduction.

Mr. Mackenna in his book on "Agriculture in India" observes, at page 97, that the prosperity of Indian agriculture depends greatly on the maintenance in health of the cattle of the country. The maintenance of cattle in a healthy state, in its turn, depends largely on the supply of proper food—a problem of no small importance. The poorer cultivators have so long been depending mainly on grass supplemented by straw and odds and ends from their farm produce. Circumstances are, however, changing and at least some of them have now got to buy commercial feeding stuffs. The problem is of great importance to the dairyman too, whose aim is to get the best possible return for the money laid out in feeding his stock.

How to feed cattle in the proper way cannot be learnt from books alone. A knowledge of the composition of feeding stuffs coupled with practical knowledge of stock-keeping, however, leads a long way towards a judicious blending of the foods and thereby obtaining a well-balanced and economical ration.

The functions of a feeding stuff.

Food is necessary to an animal—

1. To maintain the temperature of the body. The nutritive constituents of a food are oxidized in the body and thus produce heat which serves to keep the animal warm.
2. To provide energy for doing internal work. Even when an animal is not doing any external work, there is involuntarily going on work inside its body to carry out the different physiological functions incidental to vital activities.
3. To replace wear and tear in the body. As a result of the vital processes going on in the body of an animal effete chemical products are constantly being removed from

the system. Fresh materials must be given to the animal to replace this waste.

4. To produce new growth. This holds specially in the case of young animals which have not reached their limit of growth. Milch cattle must also be provided with nutrients from which they can synthesize the constituents of milk. In the case of other adult animals, while they cannot put on flesh beyond a certain limit, they can increase the store of their fat.
5. To produce the energy required for performing external work, as in the case of work cattle.

The constituents of a feeding stuff.

The usual chemical analysis of a feeding stuff consists in the determination of the contents of moisture, crude fat, albuminoids, soluble carbohydrates, woody fibre and ash. Short explanations are given below of these constituents and of the parts they play in animal economy.

Moisture. All feeding stuffs contain considerable proportions of water, even when apparently dry. The amount varies with the condition of the weather and the nature of the food.

Water is no doubt of great physiological importance in the economy of animal life but since it is furnished for the most part in liquid form, the moisture in feeding stuffs cannot be considered as having any special nutritive value. Other things being equal, moist foods should be correspondingly low in price. Besides this, the presence of too much moisture in a feeding stuff makes it liable to "heat" and to be spoilt by moulds, etc.

Ether extract or crude fat. The so-called "oil" or "fat" is generally estimated by treating the feeding stuff with ether. The extract is composed mainly of fats and oils in the case of concentrated feeding stuffs, but with fodders and hays, ether dissolves also other substances (e.g., waxes, colouring matter, organic acids, etc.)

The injected fat is oxidized in the body to produce heat and energy and, when there is a sufficiency, acts as a source of animal fat. Ordinarily this latter is stored in the body but is excreted in large quantities by milch cattle in the milk they yield.

Albuminoids or crude proteins refer to a group of substances which contain nitrogen as one of the essential elements. These are estimated from the percentage of nitrogen, which is multiplied by the factor 6.25 to give the content of albuminoids. For this purpose the

"albuminoid" nitrogen content is to be taken into account but the calculation is based sometimes on the total nitrogen figure.

It is thus seen that albuminoids are supposed always to contain 16 per cent. nitrogen, an assumption which is not quite correct. The nitrogen which is present in a feeding stuff is moreover not present wholly as pure protein. The younger and tenderer parts of a plant, germinated seeds, roots, berries, juicy fruits as well as feeding stuffs which have undergone acid fermentation or have been acted upon by yeasts and bacteria, contain appreciable amounts of non-protein nitrogenous substances.

No animal can live unless it gets a certain amount of protein which is indispensably necessary to repair the nitrogenous waste in the tissues. Growing animals and milch cattle must also be supplied with protein over and above that required for repairing the tissues. This holds to a lesser extent in the case of animals which yield wool. Fully grown animals lack the power of increasing their store of protein or flesh beyond a certain limit and the excess of protein supplied to them with their food gets oxidized in their body or is utilized in maintaining the body heat and supplying energy, a part being also utilized for the formation of body fat.

Many non-protein nitrogenous substances have a much smaller food value than proteins. They serve as fuel and can save waste of the proteins. Ruminants, however, can to a certain extent utilize nitrogenous substances of a non-protein character towards forming flesh, the change being brought about by the help of bacteria in the partly digested food.

Soluble carbohydrates. In the analysis of foods all matters not included in moisture, crude fat, albuminoids, woody fibre, and ash are classed as soluble carbohydrates. These are therefore composed of a number of different substances. Their function is in the main the same as that of fat, although they are less efficient than the latter.

Woody fibre. The cell walls and woody fibres of a plant are entered under this head. It is mostly indigestible and the fraction which is digestible requires the spending of a relatively large amount of energy to assimilate it. In the presence of much woody fibre in the food, animals can utilize the nutrients only to a smaller extent. Though of not much direct value as a food to the animal, a certain amount of woody fibre is however required in the food to give it bulk and thus to have the stomach properly filled. Feeding materials of low value, such as straw, hulls, etc., contain a high percentage of woody fibre and their addition to a concentrated feeding stuff adds to the amount of woody fibre in the latter. The determination of the amount of woody

fibre thus often serves to detect adulteration of concentrated feeding stuffs.

Ash consists of the mineral constituents of the feeding stuffs. A part of the ash is soluble in acids, and the rest consisting mainly of sand is insoluble. An excessive amount of sand in a feeding stuff indicates contamination with dust, etc.

For the growth of bones animals require lime and phosphoric acid. The blood contains iron and other mineral substances. Again, phosphorus and sulphur are essential constituents of the animal cell. Hence the food of an animal must contain a certain amount of these inorganic constituents to keep the animals in good condition. In some cases it may even be necessary to specially provide for mineral food in the shape of cattle licks containing specific salts.

It is thus seen that the constituents of a feeding stuff which practically determine its value for purposes of animal nutrition are the fats, the proteids and the soluble carbohydrates.

The digestibility of feeding stuffs.

Only that part of the food is of direct value which the animal assimilates. Digestibility experiments have been carried out in Europe and America, but unfortunately none has yet been done in India.

Feeding stuffs can be divided into two classes :—(1) concentrated foods, which include cakes and grains, and (2) roughages in which may be included grass, straw and hay. The concentrates are poor in woody fibre and the nutrients contained in the food are of a high degree of digestibility. On the other hand, the roughages are rich in woody fibre and the nutrients contained in the food have a low digestive coefficient. A comparison of the feeding values of substances of the same class of feeding stuffs, on the assumption that similar constituents are equally assimilable, is not likely to lead to any serious error. A concentrated feeding stuff cannot, however, be compared with a coarse fodder merely from figures about their chemical analyses.

Albuminoid ratio.

As already pointed out, for the purposes of generating heat and energy and for production of fat, animals can utilize either albumi-

noids, fats or carbohydrates. But for the production or repair of the tissues, etc., of its body the animal must have some albuminoids in its food. Fats or carbohydrates cannot discharge this function.

Fat is a relatively concentrated nutrient as will be evident from the fact that one pound of fat gives, on oxidation, about 2.3 times as much heat as is given by a pound of albuminoids or of carbohydrates. Hence, the percentage of fat in a feeding stuff should be multiplied by the factor 2.3 to indicate the efficiency of the content of fat as measured by the same standard as is applicable to the albuminoids and the carbohydrates.

The ratio of albuminoids to the soluble carbohydrates and fat (as calculated to its carbohydrate equivalent) is known as the albuminoid ratio. For instance, if a sample of feeding stuff contains 4.2 per cent. fat, 17.0 per cent. albuminoids, and 60.0 per cent. soluble carbohydrates, the albuminoid ratio may be calculated thus:—

$$\begin{array}{rcl}
 \text{Fat} = 4.0 \times 2.3 & . & . & . & . & . & = 9.2 & \text{equivalents} \\
 \text{Soluble carbohydrates} & . & . & . & . & . & = 60.0 & \text{,,} \\
 & & & & & & \hline
 \text{Sum} & . & & & & & = 69.2 & \text{,,} \\
 & & & & & & & \\
 & & & & & & \frac{17.0}{69.2} & \\
 \text{Therefore albuminoid ratio} & . & . & . & . & . & = 1:4.1 &
 \end{array}$$

If the proportion of albuminoids in the food falls below the proper limits, the animal will not get the necessary amount of nitrogenous material to repair the waste going on within its body and consequently the growth of the body will be restricted. On the other hand, when the food contains more albuminoids than are required, the extra amount of albuminoids, which are more costly than the other ingredients, will in the animal's body merely perform the functions which can more cheaply be performed by fats and carbohydrates, and simultaneously there will be a larger excretion of nitrogenous matter. It is thus seen that the proportion of albuminoids in the food of cattle is fixed by considerations of the health of the animals and of the higher cost of albuminoids for heat production as compared with fats and carbohydrates. From the practical point it is therefore advisable to supply just a little more than the required amount of albuminoids.

Feeding standards.

The following albuminoid ratio has been found to be the most suitable for different kinds of stock :—

Albuminoid ratio.

Oxen at rest	1 : 12
Oxen at work	1 : 7
Fattening cattle	1 : 6
Milch cows	1 : 6
Dry cows	1 : 7
Sheep (wool)	1 : 9
Breeding ewes (with lamb)	1 : 6
Fattening sheep	1 : 5
Horses at work	1 : 6
Brood sows	1 : 7
Fattening swine	1 : 6
Growing animals, very young	1 : 4
Growing animals, half-grown	1 : 6

The figures quoted above have been found out by feeding experiments and practical experience, and represent what in general, and under average conditions, constitute suitable rations for the particular purposes in view. They need not, however, be accepted as absolute standards and may be varied according to circumstances. For instance, it may after all be economically better, under a given set of conditions, to deviate to a certain extent from the standard. And in particular cases the figure quoted above may not exactly suit the requirements of an individual animal. The palatability of a ration is a very important factor. But the taste and general specific characters of food-stuffs for particular animals can only be found out by experience. In general animals flourish better on a ration which they like, even if it does not correspond to the standard, than on one which, although scientifically made up, they do not like, and the feeder has to study the individual whims of the animal.

Nevertheless the figures given above have an importance as a matter of guidance, and it may be laid down that in general the object of the feeder should be to secure a mixture of feeds in which the proportion of albuminoids in the total rations must not be below one-seventh or exceed one-fifth part of the soluble carbohydrates and fat (calculated as its carbohydrate equivalent).

Besides a proper nutritive ratio in the feed, its bulkiness must be taken into consideration. If the food is too bulky the animal cannot eat enough of it to get proper nutrition. On the other hand if the food is not bulky enough, the digestive organs of the animal will not be sufficiently distended to permit the maximum possible assimilation.

Computing rations.

It is a simple matter to calculate what the albuminoid ratio in a given mixed feed is. As an example the following ration may be taken :—

Green juar	.	.	.	.	.	.	.	20	lb.
Wheat straw	.	.	.	.	.	.	.	20	„
Rahar chuni	.	.	.	.	.	.	.	3	„
Wheat bran	.	.	.	.	.	.	.	2	„

An examination of the tables at the end of this book shows the average composition of the above feeding stuffs to be :—

	Crude fat per cent.	Albuminoids per cent.	Soluble Carbohydrates per cent.
Green juar	0.5	1.2	9.0
Wheat straw	1.3	3.2	38.0
Rahar chuni	1.5	18.0	50.0
Wheat bran	3.5	12.0	60.0

The nutrients contained in the mixed feed are therefore :—

	Fat lb.	Albuminoids lb.	Soluble Carbohydrates lb.
In 20 lb. green juar	0.10	0.24	1.80
In 20 „ wheat straw	0.26	0.64	7.60
In 3 „ rahar chuni	0.05	0.54	1.50
In 2 „ wheat bran	0.07	0.24	1.20
TOTAL	0.48	1.66	12.10

Hence the albuminoid ratio is $1.66 : \frac{1}{2} (0.48 \times 2.3) + 12.10$ } or 1 : 8.0,

The ration is thus seen to be rather poor in albuminoids. In order to make good this deficiency the addition of a food rich in albuminoids should be made. If one pound of wheat bran is substituted by one pound of groundnut cake (containing about 10 per cent. fat, 40 per cent. albuminoids and 25 per cent. soluble carbohydrates) the composition of the feed will be :—

	Fat lb.	Albuminoids lb.	Soluble Carbohydrates lb.
In 20 lb. green juar	0.10	0.24	1.80
In 20 „ wheat straw	0.26	0.64	7.60
In 3 „ rahar chuni	0.05	0.54	1.50
In 1 „ wheat bran	0.04	0.12	0.60
In 1 „ groundnut cake	0.10	0.40	0.25
TOTAL	0.55	1.94	11.75

Therefore the albuminoid ratio in this feed is :—

$$1.94 : \frac{1}{2} (0.55 \times 2.3) + 11.75 \text{ } \frac{1}{2} \\ \text{or } 1 : 6.7$$

The ration now corresponds as closely to the standard ration as can be reasonably expected in practice.

Food units.

It is very desirable to ascertain the feeding values of different feeding stuffs on an uniform basis. The difficulty is, however, in the choice of a proper standard.

As has been noted before, the valuable constituents of a feeding stuff are the fat, albuminoids, and soluble carbohydrates. Fat is more costly to buy than soluble carbohydrates. Moreover, it is about 2.3 times as efficient as carbohydrates considered as sources of energy and heat. Albuminoids, although about equal in fuel value to soluble carbohydrates, are in other respects valuable in as much as they alone are capable of repairing nitrogenous waste going on in the body of an animal. Moreover, the products voided by an animal getting an excess of albuminoids in its food is of direct manurial value. Apart from these considerations, albuminoids are more costly to buy. For all these reasons it may be assumed that fats and albuminoids are about equal in value and are two and a half times as valuable as soluble carbohydrates. There is a general agreement between the market values of the concentrated feeding stuffs and the figures obtained on the basis of these calculations.

In such a system no account is taken of the digestibility co-efficients of the feeding stuffs in question. Moreover, it is assumed that woody fibre has no feeding value and that the constituents of the same class (*e.g.*, fats), though derived from different sources, have the same feeding value.

This method of valuation though not scientifically accurate will probably be useful to the practical man and will help him to find out which, of a number of foods, is *relatively* the cheapest.

Tables of analyses.

Below are given the results of analyses of various feeding stuffs which have been made in the laboratory of the Imperial Agricultural Chemist.

It may be noted here that the albuminoids have been calculated by multiplying the albuminoid nitrogen figure by the factor 6.25. In some cases, however, only the total nitrogen was estimated and the albuminoids calculated from this. These figures are marked with an asterisk in the tables. The samples, the analyses of which have been published in the *Agricultural Ledgers* No. 10 of 1901 and No. 7 of 1903, are marked with the letter "L."

COMPOSITION OF SOME INDIAN FEEDING STUFFS

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*ACACIA ARABICA, Willd.**English.*—Indian Gum Arabic.*Vernacular.*—Babúl, Kikar.

Description of samples	% Moisture	% Ether extract	Crushed seed			% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Feed units
			% Albuminoids	% Soluble carbohydrates	% Woody fibre						
Crushed Kikar seed, kernel	10.80	2.01	11.86	54.60	13.20	5.11	1.52	2.69	1.90	5.17	11.6

*ARACHIS HYPOGÆA, Linn.**English.*—Groundnut, Earthnut, Peanut.*Vernacular.*—Mungphali, China-badam, Vilayeti-mung, Bhui-mung.

Description of samples				Kernel							
Groundnut kernel	4.00	49.25	29.00*	13.21	1.05	2.15	0.05	4.65	..	4.35	209.1
Groundnut seed from SKKRI	5.08	46.48	32.25	12.83	1.15	2.16	0.03	5.16	3.18	3.71	209.7
Groundnut grown at Bhagodi, Desur	4.62	50.10	29.99	13.25	1.21	1.66	0.07	4.70	4.65	4.42	211.2
Groundnut grown at Kharapur,	4.51	50.72	27.03	14.38	1.29	2.01	0.06	4.50	4.33	4.85	208.8
Groundnut shell				Shell							
Groundnut shell	7.35	2.80	7.57*	13.73	55.55	0.45	3.75	1.21	..	2.66	39.7
Cake, Satara				Cake							
Cake, Satara	5.42	9.87	32.13	24.08	22.08	4.23	1.29	5.31	5.14	1.48	130.0
Do. Kirkee	7.47	11.78	42.91	27.65	3.04	4.40	1.75	7.33	7.03	1.25	166.7

AVENA SATIVA, *Linn.**English.*—Oats.*Vernacular.*—Jai.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoids ratio
<i>Grain</i>											
173 L 1893	Cape oats, Cawnpore	10.80	5.93	8.77*	57.95	12.50	1.25	2.80	1.40	..	9.16
6 1898	Oats, Dehra Dun	10.17	5.27	6.39	61.57	11.29	1.89	3.42	1.18	1.02	11.52
427 1900	Cape oats, Cawnpore	10.43	5.86	7.87	58.62	13.20	1.44	2.58	1.37	1.20	9.16
277 1914	Oats, Kirkee	5.99	5.87	8.64	62.34	12.11	1.85	3.20	1.51	1.38	8.10
<i>Kernel</i>											
592 1907	Oats, Motipur	10.06	8.71	15.15*	62.37	1.88	1.67	0.16	2.41	..	3.41
598 1907	Do. Biranli	9.84	9.47	20.44*	57.04	1.84	1.37	0.00	3.27	..	3.89
594 1907	Do. Pusa	9.25	8.57	18.81*	59.66	1.91	1.77	0.03	3.01	..	4.21
<i>Husk</i>											
595 1907	Oat husk, Motipur	11.22	0.89	2.49*	44.31	35.80	0.97	4.32	0.40	..	1.46
596 1907	Do. Biranli	11.43	0.89	2.65*	42.16	37.30	0.76	4.81	0.42	..	1.63
597 1907	Do. Pusa	11.40	0.75	2.62*	43.57	35.70	1.04	4.86	0.42	..	1.73
<i>Straw</i>											
203 1894	Oat straw, Cawnpore	9.53	..	1.37	43.48	36.09	3.72	5.81	..	0.25	30.74
447 1900	Cape oat straw, Cawnpore	9.88	1.97	3.00	41.31	30.13	6.45	7.26	0.53	0.43	15.23
<i>Green fodder</i>											
230 1900	Green oats, Punjab	83.51	0.37	0.94	9.00	3.99	1.47	0.72	0.19	0.15	10.48
	Do. do. (dried)	10.00	2.02	5.13	49.14	21.78	8.00	3.93	1.04	0.83	10.43
4 1916	Green oats (dried)	4.75	1.94	6.25	45.69	30.19	7.23	3.95	1.30	1.00	8.02
107 1916	Do. do.	3.36	1.94	4.97	45.47	32.19	10.73	1.34	2.22	0.80	10.95

*BASSIA LATIFOLIA, Roxb.**Vernacular*—Mohua, Illupe.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
				<i>Cake</i>							
Mohua cake . . .	21.48	8.06	14.19	42.56	4.20	4.25	4.28	2.40	2.27	4.47	100.7
Do., Sambel- pur	15.75	19.30	13.68	40.23	4.90	4.04	2.04	2.23	2.19	6.19	122.7

*BRASSICA CAMPESTRIS, Linn.**English*.—Indian colza.*Vernacular*.—Sarson.

		<i>Grain</i>											
Yellow Sarson, Channpore	6.15	41.37	23.61*	22.25	2.97	3.40	0.25	3.76	..	4.07	184.7		
Black Sarson, Channpore	7.15	33.87	25.89*	22.04	6.40	4.30	0.35	4.14	..	3.86	171.4		
Raj, Channpore	7.50	28.90	16.29*	31.87	5.43	6.16	3.85	2.61	..	6.04	144.8		
Parka Teri, Dum- raon, Bengal.	7.18	41.51	22.25	20.30	4.44	3.90	0.42	3.87	3.56	5.20	179.7		
Laka Teri, Dum- raon, Bengal.	7.10	39.73	19.94	20.91	8.16	4.07	0.09	3.36	3.19	5.83	170.1		
Putki Teri, Dum- raon, Bengal.	7.95	41.42	20.88	22.31	3.32	3.67	0.45	3.50	3.34	5.63	178.1		
Sita Saras, Rangpur	7.14	42.62	18.63	23.52	3.43	4.02	0.64	3.26	2.97	6.52	176.6		
Sarson, Arrah	6.71	43.92	18.75	23.17	2.99	4.13	0.34	3.34	3.00	6.62	179.3		
				<i>Green fodder</i>									
Green Sarson, Punjab	86.13	0.47	2.00	4.64	3.14	2.51	1.11	0.41	0.32	2.86	10.5		
Green Sarson (dried)	10.00	3.05	13.00	30.16	20.41	16.31	7.07	2.66	2.08	2.86	70.3		

BRASSICA JUNCEA, *H.*, *J.*, & *T.**English.*—Indian mustard.*Vernacular.*—Asl rai, Rai.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
<i>Grain</i>											
380 1900	L "Kajli Sarao," Bengal.	7.61	40.22	18.44	22.79	5.50	4.01	1.43	8.11	2.95	6.28
385 1900	L Lalai tori, Dumraon	8.46	39.46	18.10	24.07	5.75	3.87	0.18	8.18	2.91	6.31
518 1900	L Rai, Nadia . .	7.63	22.51	21.04	20.07	5.56	4.89	1.35	8.84	3.51	4.60
520 1900	L Rai, Arraria . .	6.65	40.84	18.00	23.47	5.12	4.34	1.23	3.10	2.88	6.12
518 1903	Mustard, Cawnpore	8.35	41.84	18.57	22.29	4.25	4.82	0.38	8.23	2.97	6.38
<i>Straw</i>											
310 1903	Mustard straw, Cawnpore	13.50	1.64	1.94	41.10	38.79	8.24	0.79	0.36	0.31	20.12
<i>Cake</i>											
261 1902	Mustard cake, Saugor	6.33	12.59	30.00	33.46	8.84	7.88	1.10	5.24	4.80	2.68
944 1902	Mustard cake .	8.33	10.01	34.12	33.30	5.34	7.06	0.86	5.48	..	1.71
2 1911	Ditto. Military Farm, Agra	6.29	8.47	34.43	37.85	6.84	5.45	0.67	6.14	5.51	1.07
44 1912	Ditto. .	9.05	8.60	32.88	36.73	5.04	5.68	1.97	6.02	5.26	1.12
3 1915	Country mill-pressed yellow mustard cake, Cawnpore	10.04	12.17	31.18	36.33	2.89	6.35	1.04	5.60	4.60	2.33
<i>Green fodder</i>											
13 1916	Mustard green .	5.94	7.49	8.27	41.56	26.82	8.10	1.74	1.84	1.32	7.11
108 1916	Do. (Lahi) .	3.27	6.84	6.42	37.74	40.10	6.16	0.47	1.20	1.03	1.17

BRASSICA NAPUS, *Linn.**English.*—Indian rape.*Vernacular.*—Tori, Lutni, Maghi.

Description of samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
<i>Grain</i>											
Lutni, Hazaribagh .	7.38	38.21	19.06	23.21	5.00	4.14	2.04	3.29	3.05	5.83	166.4
Do. Ranchi .	6.48	40.00	17.50	21.54	5.35	4.18	4.95	3.04	2.80	6.40	165.8
Do. Jahanabad .	6.21	40.18	18.32	24.80	5.30	4.56	0.63	3.13	2.93	6.40	171.1
<i>Cake</i>											
Tori cake, Punjab	6.81	10.28	27.19	37.08	9.85	7.10	1.69	4.60	4.35	2.23	130.8
Do. do. .	7.40	11.34	27.88	36.42	8.32	6.44	2.20	4.75	4.46	2.24	134.5
Rape cake, Nagpur	24.98	4.83	30.31*	24.10	7.60	6.53	1.59	4.85	..	1.46	112.0
Do. Chawnpore	20.26	8.79	27.37	27.63	6.35	8.01	1.59	4.78	4.38	1.75	103.0
Do. Nagpur .	8.24	8.91	38.37*	31.91	5.80	5.99	0.78	6.14	..	1.37	150.1
Do. Bengal .	10.55	12.35	30.25	32.07	7.35	6.14	1.29	5.16	4.84	2.09	139.6
Do. Ferozepore	8.28	5.99	34.31	37.93	6.15	5.23	2.21	6.02	5.49	1.60	138.4
Do. Agra .	8.28	12.09	29.09	37.43	4.86	6.32	1.93	1.16	1.03	2.24	140.4
Do. Dairy Farm, Ambala	8.05	12.31	25.83	39.34	5.69	6.65	1.53	4.79	4.13	2.62	184.5

CAJANUS INDICUS, Spreng.

English.—Pigeon pea.

Vernacular.—Arhar, Rahar, Tur.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
<i>Green</i>											
79 1899	L Red, Poona . .	8.08	1.32	19.38	61.39	5.94	3.80	0.09	3.35	8.10	3.17
80 1899	L White, Poona . .	7.92	1.23	18.69	62.64	5.90	3.44	0.09	3.44	2.69	3.50
271 1899	L Do. Poona . .	8.64	1.91	19.19	60.58	5.24	3.86	0.53	3.41	3.07	3.51
203 1900	L Dark red, Kandulo, Madras.	14.33	1.31	17.25	56.95	6.55	3.50	0.05	3.25	2.76	3.45
418 1900	L White, Cawnpore . .	10.83	1.46	14.25	63.68	6.22	3.45	0.05	2.74	2.28	4.59
419 1900	L Red, Cawnpore . .	10.94	1.03	16.62	62.92	4.76	3.68	0.05	2.88	2.06	3.41
833 1902	Tur, split pulse, Poona	13.88	1.72	18.19	61.91	6.81	3.47	0.00	3.70	2.91	3.60
302 1903	Arhar, Cawnpore . .	14.29	1.08	15.82	57.20	5.82	4.40	0.49	3.13	2.53	3.00
<i>Husk</i>											
831 1902	Tur husk, Poona . .	13.98	0.73	1.631	47.16	28.98	2.80	0.09	1.02	1.01	7.74
8 1911	Karai, Military Farm, Agra	8.27	2.07	5.92	43.83	35.64	3.89	0.38	1.01	0.65	6.71
45 1912	Ditto . .	9.27	0.71	6.47	40.60	36.90	4.21	1.78	1.52	1.04	6.60
<i>Blue</i>											
295 1894	L Cawnpore . .	5.58	..	7.39	45.74	25.69	6.23	8.37	..	1.18	6.18
54 1899	L White, Poona . .	6.77	6.93	13.25	45.38	19.10	6.44	3.13	2.45	2.12	4.63
55 1899	L Red, Poona . .	6.22	7.94	14.94	46.51	14.35	6.12	3.92	2.60	2.39	4.33
266 1899	L Poona . .	8.80	2.97	7.38	49.94	21.74	6.46	2.62	1.42	1.18	7.60
204 1900	L Rajahmundry, Madras	11.97	1.39	9.19	40.43	20.89	4.59	11.54	1.61	1.47	4.50
446 1900	L Cawnpore . .	10.23	2.78	10.31	41.08	21.05	6.92	7.00	1.85	1.65	4.00

CAJANUS INDICUS, *Spreng.*—concd.*English.*—Pigeon pea.*Vernacular.*—Arhar, Rahar, Tur.

Description of samples	% Moisture	% Ether extract	% Albuminoids	% Starch carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
Arhar Dhusa	14.41	2.41	10.81	33.88	21.53	10.80	0.16	2.07	1.73	3.63	66.9
Do.	9.09	3.51	9.94	41.81	21.19	6.59	7.27	1.74	1.69	4.02	75.4
Do. Pawanpore	8.28	4.58	9.69	40.87	19.40	6.81	10.31	1.61	1.55	5.90	76.6
Do. Bangalore	7.74	0.32	9.97	45.12	39.16	3.34	0.35	0.45	0.43	11.65	55.8
Do. Jabulpore	9.03	0.29	4.30	43.10	30.30	3.68	0.39	0.74	0.69	10.13	54.6
Do. Lucknow	6.53	1.03	9.51	46.49	30.68	4.53	1.21	1.84	2.32	5.14	72.9
Do. Allahabad	7.74	1.10	7.95	45.53	30.01	4.85	1.89	1.43	1.27	6.05	68.1
<i>Chani</i>											
(Outer integument of the seed with part of the adhering kernel)											
Chani	14.99	2.06	22.25	40.30	7.15	3.98	0.29	3.72	3.96	2.43	110.0
Botany Farm, Agra	8.67	2.33	15.93	49.63	17.41	4.24	1.79	2.68	2.55	3.40	95.3
Do. Muttra	8.44	1.35	15.67	48.19	16.93	4.67	4.75	2.82	2.51	3.27	90.7
Chani	9.77	10.96	16.25	59.17	3.95	6.21	2.69	3.26	2.92	3.36	107.2

CAMELLIA THEA.

English.—Tea seed.*Vernacular.*—Chah.

Tea seed cake, Kangra	5.12	15.64	10.56	54.46	Cake 7.03	3.81	0.35	1.92	1.69	8.66	120.0
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*CARTHAMUS TINCTORIUS, Linn.**English.—Safflower.**Vernacular.—Kasumba, Kusum, Kardi, Kar.*

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates		% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
Grain												
95 1895 L	Safflower, Poona	7.49	31.84	13.31*	15.66	26.51	2.39			2.13		639
92 1899 L	Do. Do.	6.04	18.28	20.44	27.51	23.60	3.78	0.35		3.77	3.27	345
437 1900 L	Do. Cawnpore	6.23	20.33	11.37	22.97	28.08	0.68	1.34		1.87	1.82	190
Cake												
16 1898 L	Safflower Poona cake,	12.00	3.78	16.91	41.48	19.40	4.36	2.07		4.02	2.70	167
16 1902	Safflower Poona cake,	7.55	7.54	42.63	26.19	9.03	5.28	1.78		7.44	6.82	107
19 1902	Safflower Satara cake,	9.23	10.30	43.19	22.81	8.93	4.50	0.90		7.40	6.91	122
60 1902	Safflower Chalisgaon cake,	18.53	6.72	36.44	18.06	11.56	5.59	3.10		5.91	5.83	602
188 1902	Safflower Baroda cake,	7.08	6.98	40.00	26.76	10.30	6.53	1.15		6.80	6.40	106
189 1902	Safflower Baroda cake, (decorticated)	6.83	6.72	42.13	34.51	3.53	5.43	0.85		7.68	6.71	119
303 1902	Safflower Dharwar cake,	10.87	6.92	22.25	30.40	25.07	2.96	1.53		3.61	3.58	100
304 1902	Safflower Hubli cake,	11.10	6.06	27.43	26.97	24.76	2.99	0.69		4.45	4.09	110
685 1906	Safflower Poona cake,	14.22	7.04	47.77	20.19	5.27	4.89	0.62		8.08	7.64	650
686 1906	Safflower Poona cake,	10.15	8.53	30.06	24.54	20.29	4.12	2.31		5.22	4.81	117
278 1914	Safflower Kirkee cake,	6.92	13.45	34.73	28.26	11.39	4.39	0.86		5.91	5.56	121

CICER ARIETINUM, *Linn.**English.*—Common or Bengal gram, Chick-pea.*Vernacular.*—Chana, Chhola, Bât.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
						<i>Grain</i>					
Channpore . . .	11.35	4.83	18.57*	56.33	6.17	2.73	0.00	2.96	..	3.63	111.8
Red variety, Poona	8.60	5.31	15.60	60.13	7.21	3.06	0.10	3.71	2.40	4.67	112.2
White variety, large Kabuli, Channpore	10.36	4.22	22.81	57.48	1.93	3.15	0.05	4.05	3.65	2.95	125.1
White variety, small, Jubbulpore	10.80	5.01	15.10	60.93	4.41	3.12	0.54	2.63	2.13	4.77	111.1
Poona . . .	17.21	5.94	18.12*	55.36	0.73	2.64		2.90	..	3.81	115.6
Channpore . . .	13.43	4.41	18.38	54.65	5.85	3.28	0.00	3.05	2.04	3.52	111.6
Military Farm, Agra	8.82	4.09	18.81	57.88	7.56	2.69	0.15	3.27	3.01	3.58	115.1
Do. . .	8.63	4.79	17.63	57.96	7.62	2.73	0.44	2.97	2.82	3.91	111.0
Supply Reserve Depot, Peshawar	12.92	4.61	16.36	55.81	7.52	2.75	0.03	2.69	2.62	4.06	104.2
Supply Reserve Depot, Peshawar	11.56	4.12	18.07	55.90	7.35	2.97	0.03	3.15	2.89	3.61	111.4
Karkee . . .	0.47	4.05	20.56	57.18	5.71	2.90	0.13	3.55	3.29	3.23	112.7
Ruk . . .	0.14	4.28	19.36	56.27	7.27	3.43	0.25	3.30	3.10	3.41	115.4
Quetta . . .	0.65	4.15	18.57	55.05	8.72	3.25	0.50	3.18	2.99	3.46	112.0
Mhow . . .	0.72	5.10	16.90	58.41	6.70	2.93	0.24	2.87	2.70	4.15	113.3
Jubbulpore . . .	10.50	5.73	14.64	56.75	7.71	3.70	0.97	2.42	2.34	4.77	107.6
Military Farm, Kasauli	9.09	4.03	18.58	48.49	12.20	4.13	3.58	3.35	2.97	3.10	107.5
						<i>Flour</i>					
Flour with husk purchased	13.25	2.14	19.12*	55.30	7.05	3.11		3.08	..	3.15	108.5
Flour prepared at home	13.98	2.64	21.43*	57.15	2.26	2.66		3.43	..	2.94	117.1

CICER ARIETINUM, *Linn.*—conold.*English.*—Common or Bengal gram, Chick-pea.*Vernacular.*—Chana, Chhola, But.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
<i>Husk</i>											
619 1902	Gram husks . .	13.42	0.40	3.75*	35.07	42.24	4.22		0.60	..	9.61
6 1915	Gram Thoith (husk), Ambala Dalry	4.80	4.34	6.15	68.11	11.31	4.42	0.48	1.16	1.60	12.11
7 1915	Gram husk, Ambala	11.16	0.94	5.91	40.33	37.23	3.98	0.25	1.10	0.95	7.22
<i>Bhusa</i>											
204 1894	L. Cawnpore . .	10.11	..	4.46	38.84	27.63	0.66	9.30	..	0.71	8.71
57 1890	L. Poona . . .	6.56	2.69	3.06	44.55	28.93	9.28	4.92	0.68	0.46	10.50
504 1899	L. Do. . . .	8.21	2.64	2.94	49.70	21.87	11.81	2.83	0.67	0.47	18.95
366 1902	Gram Bhusa . .	8.83	1.70	3.25	51.37	26.62	7.62	0.51	0.58	0.52	19.90
370 1902	Do. . . .	9.58	3.08	4.25	46.10	19.33	8.18	8.58	0.83	0.68	12.51
299 1903	Cawnpore . .	11.43	1.26	2.87	42.81	28.52	8.18	4.93	0.58	0.46	15.92
309 1914	Bhusa, Bangalore .	9.26	0.89	1.44	40.36	40.40	4.24	0.31	0.75	0.71	9.55

COCOS NUCIFERA, *Linn.**English.*—Coconut.*Vernacular.*—Nariyal, Narikel, Kalapa.

<i>Calo</i>											
23 1898	L. Poona	7.72	16.53	113.62	44.57	12.45	14.65	0.48	3.31	2.17	8.65
302 1914	Bangalore .	11.47	12.35	20.07	42.99	7.02	15.10	1.00	3.22	3.21	3.56

*COIX LACRYMA-JOBI, Linn.**English.*—Job's tears.*Vernacular.*—Jargadi, Kasi, Ma-yuen.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
Assam . . .	11.29	4.93	9.41	60.13	6.56	1.85	5.80	1.58	1.51	7.57	96.1

COOKED FOOD.

"Khichuri" (rice and tur), Cawnpore	11.68	1.05	13.44*	31.50	0.67	1.80	0.00	2.15	..	5.40	107.6
Common bread (Roti).	22.50	1.00	7.75*	60.51	0.66	1.49	0.60	1.24	..	8.88	88.4
"Doodhi" bread (baked).	14.45	2.60	8.31*	71.06	0.09	2.09	0.00	1.33	..	9.10	107.8
"Semai" (Macaroni).	13.50	2.50	8.60*	73.33	0.49	1.40	0.00	1.33	..	9.12	101.6
"Poori" . . .	18.00	8.27	9.51*	62.49	0.45	1.50	0.00	1.40	..	8.75	108.4
"Kachwari" . .	19.27	32.51	5.60*	50.24	0.10	1.09	0.00	0.91	..	2.19	145.7

*CROTALARIA JUNCES, Linn.**English.*—Sunn-hemp.*Vernacular.*—San, Sanai.

Description of Samples	Fodder										
	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Food units	
Rajahmundry Maurice	14.39	1.12	11.31	35.85	27.39	6.42	3.51	2.29	1.99	8.39	66.9

CURCUMA ZEDOARIA, *Rosc.**English.*—Long and round Zedoary.*Vernacular.*—Sati.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
232 1908	Flour, Cawnpore	19.30	0.57	0.51	79.09	0.00	0.38	0.15	0.08	..	1374
237 1908	Starch, Curcuma Zedoaria	18.97	0.68	0.49	79.30	0.00	0.35	0.21	0.07	..	1650

CYAMOPSIS PSORALOIDES, *DC.**English.*—Cluster-bean.*Vernacular.*—Guar, Khurti.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	Grain						% Albuminoid nitrogen	Albuminoid ratio
						% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio		
108 1899	L Poona . . .	8.99	2.09	28.31	48.42	7.68	3.32	0.20	4.93	4.53	165		
442 1900	L Cawnpore . .	10.67	2.63	26.18	47.04	8.40	3.82	0.27	4.40	4.19	206		
59 1911	Military Farm, Muttra	9.04	3.36	25.09	56.10	3.13	3.04	0.24	4.29	4.01	204		

DIOSCOREA FASCICULATA, *Rozb.**English.*—Kidney-shaped yam, Karen potato.*Vernacular.*—Suthni.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	Tubers						% Albuminoid nitrogen	Albuminoid ratio
						% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio		
245 1916	Suthni, Pusa village	7.38	0.64	2.75	84.24	1.28	3.61	0.10	0.56	0.44	1217		

*DOLICHOS BIFLORUS, Linn.**English.—Horse-gram.**Vernacular.—Kulthi.*

Description of samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woolly fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Feed units
<i>Grain</i>											
Kulthi, Poona	7.45	0.89	20.06	60.62	4.57	4.34	2.07	3.74	3.21	3.12	113.0
Do., Berhampore, Madras	10.20	0.72	16.31	63.96	3.69	3.51	1.61	3.40	2.61	1.03	106.3
Kulthi, Matigai (Salem)	9.98	0.93	21.04*	59.33	4.76	3.06	0.00	3.31	..	2.80	110.5
Kulthi, Belgaum	10.36	0.92	20.12	60.31	4.42	3.37	0.50	3.68	3.22	3.10	112.0
<i>Bhusa</i>											
Kulthi, Berhampore Madras	5.60	2.63	5.25	49.06	28.01	6.54	2.31	1.03	0.81	10.70	69.4
Kulthi Bhusa	11.94	2.63	7.75	42.53	16.81	8.25	10.00	1.50	1.24	6.27	68.5

*DOLICHOS LABLAB, Linn.**Vernacular.—Val, Popat.*

<i>Grain</i>											
White variety, Poona	7.11	0.93	23.34	56.98	6.94	3.99	0.71	1.06	3.73	2.54	117.6
White variety, Poona	9.55	2.03	23.44	53.26	7.42	4.20	0.10	4.07	3.75	2.47	116.9
White "Kadawa," Poona	9.08	1.11	20.75	58.38	6.78	3.85	0.05	3.46	3.32	2.91	113.0
Large white variety, "Dama n i s," Poona	9.70	1.14	19.56	61.94	4.69	2.92	0.05	3.24	3.13	3.30	113.7
"Walanis," Poona	9.19	1.17	23.31	53.35	6.12	3.60	1.17	3.98	3.73	2.49	116.6
Red variety Rajahmundry	12.90	1.12	17.75	57.46	7.48	3.24	0.05	3.31	2.84	3.38	104.6
Val, Kirkee Farm	9.28	1.16	14.44	67.36	4.01	3.75	0.09	3.26	2.31	4.85	106.4
Lotia, Cawnpore	12.99	1.72	22.81	54.40	4.34	3.55	0.19	3.98	3.65	2.56	115.17
<i>Bhusa</i>											
Val Bhusa, Poona	9.93	3.72	13.37	43.03	16.17	11.27	2.51	2.56	2.14	3.86	85.8
<i>Straw</i>											
Lobia straw, Cawnpore	13.54	0.22	4.57	40.80	32.90	5.18	2.09	0.87	0.73	9.39	54.5

ELEUSINE CORACANA, Gaertn.

Vernacular.—Nagli, Ragi, Bavto, Marua.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
87 1893	L Nagli, Poona .	9.38	1.38	5.37	78.45	2.47	2.47	0.47	0.93	0.86	10.20
47 1900	L Do Punjab .	12.33	1.09	6.12	73.11	3.45	3.46	0.14	1.23	0.98	12.30
195 1900	L " Bhuddai " or " Bhada Munda, " Ganjam, Madras	11.13	1.26	7.69	66.95	3.20	2.69	4.03	1.41	1.23	9.94
196 1900	L " Bhada Munda," Ganjam, Madras	13.06	1.39	6.31	66.91	2.35	2.32	7.16	1.09	1.01	11.10
197 1900	L " Rinja " or " Rinja Munda," Ganjam, Madras	12.27	1.15	6.94	66.72	3.67	3.28	4.97	1.12	1.11	10.91
475 1900	L " U Ractrah," Hill District, Assam	14.03	1.03	6.00	74.91	2.39	2.25	0.05	1.01	0.96	12.14
589 1902	Bavto, Nadial .	15.20	1.40	5.25*	66.54	2.66	4.20		1.48	..	7.74
590 1902	Do. do. (cleaned grain)	14.48	1.40	8.00*	71.67	2.30	2.15		1.28	..	9.18
603 1902	Nagli (cleaned) .	15.96	1.33	5.25	73.92	1.73	2.41		0.86	0.84	14.06
604 1902	Do. (uncleaned) .	15.14	1.26	5.31	73.49	2.20	2.69		0.89	0.85	14.40
604A 1902	Bavto, Nadial .	13.47	1.05	5.94*	74.21	2.99	2.34		0.94	..	12.00
605A 1902	Do. .	13.52	1.24	5.62*	75.38	1.90	2.19		0.90	..	13.95
641 1902	Nagli, Poona .	14.36	1.34	6.41*	73.31	1.83	2.69		1.03	..	11.57
840 1903	Do. Mysore .	13.22	1.20	5.35*	75.13	2.10	2.98		0.86	..	13.20
644 1902	Nagli flour, Poona .	14.77	1.19	6.87*	72.50	1.73	2.94		1.10	..	10.95

ELEUSINE CORACANA, *Gaertn.*—concl'd.*Vernacular.*—Nagli, Ragi, Bavto, Marua.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
Nagli husk . .	17.36	2.03	6.25	48.05	0.75	13.52	11.04	1.21	1.02	7.6	63.8
Do. Nadiad . .	12.94	2.05	7.50*	46.82	2.72	21.97		1.24	..	6.87	70.7
Nagli Husk . .	17.13	1.40	6.88	54.55	0.25	9.01	1.78	1.16	1.10	8.40	75.3
Do. Nadiad . .	16.80	1.90	7.68*	54.08	0.34	10.20		1.22	..	7.61	78.0
Do. Poona . .	13.02	1.35	5.50*	36.58	4.55	38.10		0.88	..	7.22	53.7
Do. Mysore . .	15.50	1.50	3.75*	66.61	3.77	6.87		0.60	..	18.88	79.3
Green fodder											
"Madia," Punjab .	80.83	0.48	1.94	7.85	5.38	2.28	1.24	0.18	0.31	4.61	13.9
Do. (dry state)	10.00	2.25	0.11	36.86	25.26	10.70	5.82	2.25	1.40	4.61	65.3

ERUCA SATIVA, *Lam.**English.*—The Rocket.*Vernacular.*—Tara-mira, Tara-moni, Usan, Sihuan.

Sihuan, Cawnpore	116.50	138.45	124.88	124.21	Grain	4.29	4.02	2.65	4.23	3.98	4.07	170.0
Rocket, Punjab	115.94	116.35	1131.25	1141.45	Cake	7.84	6.03	1.14	5.37	5.00	1.79	135.5
Tara-mira, Punjab	119.44	118.83	1136.00*	1128.48		6.86	5.52	4.87	5.76	..	1.36	140.6

COMPOSITION OF SOME INDIAN FEEDING STUFFS

FAGOPYRUM ESCULENTUM, *Moench.**English.*—Buck wheat.*Vernacular.*—Phaphra, Trumba, Kootroo.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
2 1916	Phaphra, Mahanada (near Pusa)	13.04	2.36	8.75	73.32	0.56	1.72	0.25	1.48	1.40	0.99
69 1911	Kootroo (husked) Benares	10.94	2.73	11.52	72.53	0.36	1.81	0.11	1.90	1.84	6.24
70 1911	Kootroo (unhusked)	10.86	2.63	11.59	66.98	5.50	2.09	0.35	2.10	1.85	0.90

GLYCINE SOJA, *Benth.**English.*—The Soybean.*Vernacular.*—Bhat, Gari-kulay.

		Soybean								
459 1902	Soybean, Japan	6.70	10.88	38.75*	29.75	8.69	5.23	6.20	..	1.41
490 1902	Do. do.	6.72	11.47	43.25*	26.39	6.35	6.13	6.02	..	1.26
1013 1902	Do. Dunraon	7.57	15.55	30.12	34.87	5.21	6.18	0.20	5.72	4.82 2.16
1017 1902	Do. do.	7.66	19.72	30.75	30.41	4.50	6.66	0.30	5.16	4.02 2.16
1019 1902	Do. do.	7.87	17.58	32.11	31.48	4.09	6.37	0.29	5.10	5.19 2.21
1023 1902	Do. Cawnpore	7.57	22.61	31.25	29.80	3.56	5.78	nil	5.44	5.00 2.08
1026 1902	Do. do.	8.97	21.30	26.12	34.36	2.67	5.58	nil	5.40	4.18 3.19
1029 1902	Do. do.	8.95	17.93	31.12	32.23	4.40	5.27	0.10	5.79	4.98 2.96
176 1903	Do. Siripur	6.48	18.61	34.81	28.32	5.21	6.29	0.28	0.11	5.57 2.04
177 1903	Soybean, Farm Siripur	5.82	21.34	33.44	29.21	3.79	16.40	nil	5.95	5.55 2.14
28 1904	Soybean, Farm Manjri	8.21	17.47	36.62	30.17	2.26	5.27	6.80	5.86	1.91
30 1904	Soybean, Farm Manjri	6.60	29.74	29.44	33.25	3.77	6.20	5.40	4.71	2.71
38 1904	Soybean, Farm Manjri	7.36	19.02	25.19	39.65	3.55	6.23	4.89	4.03	3.35

GLYCINE SOJA, *Benth.*—concd.*English.*—The Soybean.*Vernacular.*—Bhat, Gari-kulay.

Description of samples	% Moisture	% Ether extract,	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral water	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Feed units
Soybean straw											
Soybean Bhusa, Dumraon	9.68	1.33	4.31	45.69	27.91	10.38	0.70	0.76	0.69	11.51	59.8
Soybean Bhusa, Dumraon	9.21	0.87	2.38	47.93	28.45	10.15	0.98	0.54	0.38	20.98	56.1
Soybean Bhusa, Jampur	9.62	3.13	5.10	46.78	21.29	10.32	5.97	0.95	0.83	10.40	67.6
Soybean Bhusa, Jampur	8.79	2.42	6.41	41.73	16.85	10.98	9.79	1.12	1.03	7.81	69.9
Soybean straw, Siripur Farm	5.95	1.26	2.75	38.10	40.09	5.66	0.19	0.46	0.44	14.01	48.1
Soybean straw, Siripur Farm	5.77	1.36	3.62	11.80	30.22	7.77	0.37	6.76	0.58	12.44	54.9
Soybean, Mayjri	9.84	3.29	6.12	40.20	22.20	7.00	0.35	1.03	1.20	6.99	77.7
Do, do	10.64	0.83	1.08	49.67	29.35	7.70	0.19	0.39	0.27	30.70	59.0

GOSYPIUM.

English.—Cotton seed.*Vernacular.*—Sarki, Kapasia, Rui, Tula.

L.	Cotton seed, Poonch	8.48	18.33	11.74	38.78	<i>Cotton seed</i>		1.22	2.57	1.87	6.00	114.0
						17.53	3.92					
L.	Do. Do.	6.93	14.57	11.34	35.96	25.05	4.47	1.68	2.10	1.81	6.13	109.7
L.	Do. Surat	6.83	16.51	12.54	32.51	27.11	4.23	0.24	2.86	2.00	5.62	105.2
L.	Egyptian seed	6.75	28.40	22.63	21.06	16.71	4.19	0.26	3.78	3.63	3.82	118.6

GOSSYPIMUM—*contd.**English.*—Cotton seed.*Vernacular.*—Sarki, Kapasia, Rui, Tula.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
<i>Cotton seed—concd.</i>											
439 1900	L "Hybrid," Cawnpore	9.04	17.78	15.06	31.05	22.30	3.37	0.50	2.52	2.41	1.53
440 1900	L "Cook's Staple," Long Cawnpore	10.20	19.49	20.75	27.03	18.10	3.07	0.40	3.37	3.32	3.46
441 1900	L "Cawnpore var." Cawnpore	9.20	18.68	16.13	35.38	16.62	3.55	0.38	2.01	2.50	4.86
579 1904	Cotton seed	6.41	13.60	13.12	38.34	24.59	3.79	0.07	2.44	2.10	5.31
77 1908	Cotton seed, Lucknow	6.88	23.11	16.09	32.61	15.71	4.26	0.74	2.72	2.67	5.14
78 1908	Do. Do.	6.54	14.55	15.10	33.81	19.93	3.78	0.20	2.65	2.43	4.82
43 1912	Cotton seed, Military Dairy Farm, Agra	10.86	11.67	14.07	39.79	19.67	10.81	0.24	2.65	2.25	1.79
279 1914	Cotton seed, Kirkee	7.21	19.59	17.06	33.48	16.67	1.95	1.04	2.90	2.13	4.60
308 1914	Cotton seed, crushed, Mhow	7.47	17.99	15.65	35.83	15.79	5.27	1.95	2.62	2.50	4.94
314 1914	Cotton seed, Belgumna	8.44	18.37	15.04	36.12	17.61	3.06	0.16	2.65	2.40	5.23
329 1914	Cotton seed, Jabulpore	8.84	18.54	15.50	33.54	18.32	3.93	0.23	2.53	2.48	4.92
16 1916	Cotton seed, Varhadi, Kirkee	6.60	19.90	17.86	35.87	15.60	4.09	0.08	2.88	2.86	4.57
41 1916	Cotton seed, Varhadi, Kirkee	6.24	14.58	15.17	40.03	19.77	4.15	0.06	2.76	2.43	4.45
42 1916	Cotton seed, Varhadi, Kirkee	7.47	12.33	15.76	39.73	20.49	4.12	0.10	2.73	2.52	4.32
47 1916	Cotton seed, Varhadi, Kirkee	5.55	19.32	17.59	35.35	18.00	4.11	0.08	2.96	2.82	4.54
50 1916	Cotton seed, Varhadi, Kirkee	5.24	16.34	15.65	39.80	18.78	4.10	0.09	2.73	2.50	4.94
57 1916	Cotton seed, Varhadi, Kirkee	5.14	19.24	18.27	34.19	19.02	4.03	0.11	3.18	2.92	4.29

GOSSYPIMUM—contd.

English.—Cotton seed.*Vernacular.*—Sarki, Kapasia, Rui, Tula.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Feed units
<i>Cotton seed meal</i>											
Cotton seed meal (above straining)	4.09	33.53	33.81	20.48	1.45	5.94	0.19	5.38	5.44	2.80	188.8
Cotton seed meal, Coimbatore	6.59	10.13	14.62	49.74	9.44	10.52	7.96	2.71	2.31	4.38	162.6
Cotton seed meal, Karbet	7.28	8.86	28.33	35.60	9.98	6.17	0.78	4.69	4.33	2.08	131.6
Cotton seed meal, Alor	7.38	0.97	31.15	36.06	7.37	6.38	1.39	5.26	5.65	1.88	130.6
Cotton seed meal, Ruk	7.44	9.29	30.86	36.33	8.44	6.45	1.19	6.13	4.94	1.87	130.7
Cotton seed meal, Quetta	8.48	8.08	31.06	35.30	8.08	6.30	1.20	5.21	5.11	1.70	136.9
Cotton seed meal, Quetta	7.45	10.17	31.14	37.07	7.44	5.98	0.75	5.20	4.98	1.94	140.4
Cotton seed meal, Belgaum	8.60	8.06	30.68	36.42	8.40	6.26	1.40	5.66	4.91	1.70	133.3
Cotton seed meal, Jabalpur	8.09	8.87	30.90	36.64	8.61	6.27	1.22	5.19	4.94	1.84	136.1
<i>Cotton seed hull</i>											
Cotton seed hull, Ruk	8.32	5.20	6.52	49.58	26.05	3.29	0.14	1.09	1.04	9.44	78.0
Cotton seed hull, Alor	7.98	8.67	5.07	50.87	29.32	3.04	0.15	0.87	0.81	11.65	72.4
Cotton seed hull, Bangalore	8.68	5.05	5.93	50.06	27.44	2.75	0.09	1.11	0.95	10.40	77.6
<i>Cotton seed cake</i>											
Cotton seed cake, Quetta	6.05	12.05	36.00	27.84	6.96	11.10	5.76	..	..	1.54	134.9
Cotton seed cake, Quetta	14.31	1.36	20.94	40.17	17.87	4.38	0.79	3.55	3.35	8.67	95.9
Cotton seed cake, (whole seed), Lahore	9.67	7.25	18.37	39.97	17.36	5.34	2.04	3.20	2.94	3.68	104.0

Gossypium—conold.

English.—Cotton seed.

Vernacular.—Sarki, Kapasia, Rui, Tula.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woolly fibres	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminical nitrogen	Albuminoid ratios
Cotton seed cake—conold.											
780 1902	Cotton seed cake, (10 per cent. husk removed), Lahore	9.65	6.57	18.81	41.00	17.81	5.32	2.24	3.87	3.00	3.01
787 1902	Cotton seed cake, (delinted and decorticated), Lahore	11.33	11.23	24.44	35.37	10.38	5.01	1.34	4.38	3.01	2.50
882 1902	Cotton seed cake, Hisar, Punjab	9.82	8.51	17.00	40.33	18.59	4.71	1.04	2.00	2.72	3.22
5 1903	Cotton seed cake, Hall, England	10.41	4.77	17.87	39.41	20.53	5.01	1.98	3.07	2.86	2.82
40 1903	Cotton seed cake, England	10.00	4.76	17.50	43.35	17.27	4.93	1.29	..	2.80	1.19
47 1903	Cotton seed cake, England	10.73	4.94	17.44	42.60	18.75	4.50	0.95	..	2.70	1.16
504 1903	Cotton seed cake	13.30	0.99	34.97	29.55	6.21	5.92	0.66	5.82	5.50	1.12
570 1904	Cotton seed cake, Kirkuc (crushed in country ghani)	36.55	5.83	11.45	29.26	13.77	3.05	0.09	2.08	1.83	3.12
3 1911	Cotton seed cake, Military Farm, Azra	8.61	5.26	16.27	42.89	22.30	4.51	0.16	3.02	2.60	3.88
58 1911	Cotton seed cake, Military Farm, Muttra	8.32	3.92	16.02	48.18	19.28	3.99	0.29	2.61	2.56	3.57
37 1914	Cotton seed cake, Military Farm, Lahore	9.88	5.61	18.18	42.32	19.28	4.34	0.39	3.01	2.61	3.18
35 1914	Cotton seed cake, Military Farm, Ambala	7.55	7.62	19.49	42.47	14.48	5.58	2.81	3.14	3.56	3.08
295 1914	Cotton seed cake, Military Farm, Ruk	8.56	9.88	24.30	39.26	8.10	17.89	1.01	4.28	3.80	2.18
313 1914	Cotton seed cake, Military Farm, Mhow	8.48	5.13	19.88	40.29	18.72	5.59	1.91	3.26	3.18	2.61
1 1915	Cotton seed cake (uncorticated), Cawnpore	8.65	4.12	20.41	41.11	20.93	4.49	0.29	3.43	3.37	2.47

*English.—Grass and Hay.**Vernacular.—Ghas, Gawat.*

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
<i>Grass seed</i>											
Grass seed, Bikaner State	11.23	7.72	27.12*	50.79	0.50	2.41	0.23	4.84	..	2.58	138.0
<i>Grass</i>											
Grass (green) . . .	11.07	0.00	2.69	45.40	32.07	2.05	6.72	..	0.47	15.88	52.1
Do. Aligarh	4.76	0.00	8.06	50.87	32.04	2.39	6.89	..	0.49	16.62	58.5
Grass (green), Saharanpore	47.43	0.00	2.86	22.00	22.23	2.36	3.32	..	0.42	8.27	28.7
Grass (green), Aligarh	13.83	0.00	3.56	48.16	25.42	3.84	5.39	..	0.57	13.53	57.1
Plumed grass, Juhl, Cawnpore	10.07	0.00	4.45	50.80	29.76	2.37	2.55	0.38	0.71	11.42	61.9
Grass (cut dry), Nagpur	9.81	0.00	1.54	39.39	34.58	2.87	12.01	0.26	0.23	25.58	43.2
Grass (cut green), Nagpur	9.23	0.00	2.46	44.16	31.75	1.74	10.66	0.41	0.39	17.95	50.3
Grass, Kaira, Gujarat	8.72	0.00	2.45	45.87	34.48	1.10	7.38	0.45	0.32	18.72	52.0
Grass, Aligarh	6.87	0.00	5.60	48.99	30.08	3.15	5.31	1.05	0.89	8.75	63.0
Grass, Navapur, Bombay	12.40	0.00	2.12	51.21	27.16	2.83	4.28	0.37	0.54	24.18	56.5
Grass, Thana, Bombay	12.21	0.00	1.50	39.13	35.64	4.39	7.32	0.25	0.24	20.09	42.9
Grass, Sangur, Central Provinces	10.59	0.00	2.07	49.89	28.11	2.55	6.79	0.53	0.38	24.10	53.1
Grass, Jubbulpore, Central Provinces	11.78	0.00	2.31	43.51	33.66	2.38	6.39	0.37	0.37	18.84	49.3
Grass, Bedai, Central Provinces	11.56	0.00	1.51	44.42	35.24	1.99	5.63	0.21	0.21	30.91	47.7
Grass, Kulphar	11.89	0.00	1.37	49.94	26.88	2.09	7.85	0.22	0.22	36.45	53.4
Grass, Bilopal	10.78	0.00	0.94	43.92	34.98	1.14	8.24	0.15	0.15	46.72	10.3

*English.—Grass and Hay.—contd.**Vernacular.—Ghas, Gawat.*

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
<i>Grass—contd.</i>											
378 1900	L Grass, Hiranin .	11.58	0.00	1.31	46.33	31.80	2.14	6.84	0.22	0.21	30.3
379 1900	L Grass, Sohazpore .	10.91	0.60	1.37	48.21	32.08	1.34	4.90	0.29	0.22	30.1
283 1901	L Grass (yellowish), Cawnpore	9.03	0.93	4.88	41.05	33.57	4.05	6.49	0.03	0.18	6.4
284 1901	L Grass (greenish), Cawnpore	9.06	1.83	4.19	39.89	31.09	3.48	7.46	0.67	0.51	10.4
828 1906	Grass, Ambala .	7.45	0.99	7.62	32.12	35.65	8.10	7.68	1.30	1.22	4.1
26 1908	Grass (forest), Sandhaur	12.15	1.62	1.73	45.84	33.54	2.28	2.84	0.28	0.27	2.6
27 1908	Grass (forest), Kona	10.98	1.72	2.81	46.92	32.59	2.12	2.83	0.47	0.45	17.0
28 1908	Do. Kus .	10.51	1.06	2.72	44.09	34.37	1.99	3.83	0.46	0.44	11.4
29 1908	Do. Gaurar .	12.31	1.19	1.91	44.85	33.48	2.77	3.40	0.40	0.31	14.0
30 1908	Grass (general ad- mixture)	9.87	2.75	2.50	44.26	34.19	2.48	3.95	0.11	0.40	20.2
38 1905	Grass (forest), Bundelkhand	8.82	1.07	2.38	48.22	31.59	2.46	5.16	0.40	0.58	21.2
39 1908	Grass (forest), Bundelkhand	7.58	1.14	1.39	49.21	31.42	1.97	7.29	0.28	0.22	37.2
251 1908	Grass, Barrackpore	7.39	1.63	2.63	43.25	38.60	2.41	4.06	..	0.40	17.8
252 1908	Do. Do.	7.00	1.18	5.94	44.17	18.34	8.95	14.41	..	0.95	7.9
7 1909	Grass (Kessari), Lucknow	7.06	1.90	3.19	48.00	32.15	3.01	4.09	..	0.51	16.0
263 1909	Grass (todder), Muttra	8.16	0.55	2.50	47.40	36.82	4.12	0.75	0.61	0.40	19.5
16 1910	Grass, Muttra .	6.25	1.82	4.69	51.56	30.57	1.73	3.36	0.81	0.75	11.8
18 1910	Do. Do.	7.36	1.33	2.06	48.83	32.81	2.61	5.00	0.36	0.33	25.1
22 1910	Do. Barrackpore	8.08	1.16	3.05	49.17	30.16	2.38	5.10	0.67	0.63	13.4

*English.—Grass and Hay.—contd.**Vernacular.—Ghas, Gawat.*

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Starch and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Feed units
<i>Grass—contd.</i>											
Grass, Bareilly	11.47	1.72	2.16	48.72	29.30	2.54	3.79	0.42	0.39	21.41	50.2
Do. Agra	9.95	1.43	0.63	49.32	30.67	1.66	6.94	0.20	0.10	83.51	54.5
Do. Do.	10.17	1.62	5.98	50.57	23.46	4.53	3.68	1.14	0.96	9.08	60.6
Do. Meerut	13.83	1.53	5.66	47.39	24.06	3.38	4.15	1.16	0.91	8.00	65.4
Do. Do.	11.65	1.42	2.68	50.21	24.40	1.95	7.49	0.47	0.43	19.06	60.5
Do. Bankhet	9.64	1.92	3.38*	49.89	23.64	2.63	3.99	0.55	..	16.04	63.1
Do. Do.	10.53	2.91	2.80*	51.50	27.24	1.99	3.13	0.43	..	20.75	65.7
Do. Nowshera	7.72	0.83	4.23	49.42	21.68	5.69	10.43	0.75	0.68	12.13	62.1
Do. Do.	7.82	1.97	2.28	19.89	29.87	2.10	6.07	0.58	0.37	23.87	60.6
Do. Lucknow	7.44	1.92	1.18	49.66	31.83	1.53	6.09	0.30	0.21	36.51	58.2
Do. Do.	7.41	1.44	1.75	49.03	29.95	2.15	3.27	0.30	0.28	26.91	57.0
Do. Nahratal	36.81	1.00	2.41*	30.80	23.88	3.12	1.98	0.59	..	13.73	30.3
Do. Do.	24.28	1.14	3.56*	37.39	28.91	2.58	2.14	0.57	..	11.24	49.1
Do. Do.	19.80	0.83	2.25*	40.16	32.15	1.73	3.02	0.36	..	13.70	47.9
Do. Do.	21.57	1.14	2.69*	39.34	31.45	1.90	1.91	0.43	..	15.60	48.9
Grass, Marwale, Hyderabad	7.90	1.64	2.98	47.10	31.21	1.91	7.20	0.50	0.58	17.07	58.7
Grass, Pownia, Hyderabad	7.54	1.28	1.84	46.04	28.37	2.79	12.14	0.45	0.30	28.62	53.5
Grass, Rowsa, Hyderabad	8.05	2.05	1.71	48.46	33.40	2.00	4.33	0.39	0.27	31.11	57.9

*English.—Grass and Hay.—contd.**Vernacular.—Ghas, Gawat.*

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibres	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
<i>Grass—concl.</i>											
63 1913	Grass, Gundell, Hyderabad	7.97	1.35	2.23	49.47	28.75	3.04	6.19	0.42	0.36	23.58
94 1913	Grass, Barrackpore	11.67	1.47	5.12	55.08	19.31	4.83	2.69	0.05	0.82	11.42
127 1915	Grass, Meerut (cut from shady plot)	8.24	1.31	2.56	53.16	29.40	1.66	0.07	0.46	0.41	20.51
129 1915	Grass, Meerut (cut from open and dry plot)	5.43	1.22	3.71	46.43	34.05	2.36	6.80	0.77	0.59	18.27
180 1915	Grass, Sirwala (cut from open and dry plot), Meerut	4.51	0.93	1.92	48.48	37.15	1.70	5.41	0.36	0.29	27.81
138 1915	Grass, Sirwala (cut from shady plot), Meerut	5.14	1.01	2.65	46.75	35.91	2.00	6.54	0.45	0.42	18.32
142 1915	Grass, Sirwala (cut from open and dry plot)	4.45	1.06	2.24	47.92	33.68	1.94	6.71	0.45	0.38	22.48
7 1916	Grass (Nevla), Kirkee	7.38	1.78	1.90	53.41	26.81	4.00	4.72	0.35	0.30	30.20
8 1916	Grass (Arsenal), Kirkee	6.21	1.95	2.68	45.93	32.62	2.80	8.21	0.47	0.43	18.81
9 1916	Grass (Arsenal), Kirkee	7.13	1.54	3.40	43.03	30.34	2.03	12.53	0.59	0.54	13.70
104 1916	Grass (Rhodes), Jubbulpore	1.50	1.48	4.47	45.09	34.66	9.73	2.98	1.69	0.72	19.85
<i>Hay</i>											
4 1904	Hay, Cawnpore	9.78	1.14	3.50	55.71	20.39	4.74	4.74	0.63	0.56	16.07
1089 1904	Hay, Agra, United Provinces	8.04	0.00	2.94	54.68	23.67	4.39	6.38	0.57	0.47	16.60
630 1907	Hay, Gonda, United Provinces	9.69	1.36	2.25	47.72	33.08	2.45	4.46	0.40	0.36	22.16
637 1907	Hay, Bundelkhand	7.95	1.28	1.71	51.25	31.24	2.63	3.94	0.35	0.27	31.69
639 1907	Do. Do.	9.64	1.23	1.32	46.10	32.00	2.34	6.37	0.27	0.21	38.88
643 1907	Do. Do.	8.53	1.28	2.26	45.57	31.66	2.30	8.40	0.44	0.36	21.46

English.—Grass and Hay.—concd.*Vernacular.*—Ghas, Gawat.

Description of samples	Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates		% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
				Hay—concd.								
Hay, Bahraich, United Provinces	9.48	1.50	1.63	48.52	31.81	2.61	4.45	0.28	0.26	31.88	56.4	
Hay, Gorakhpur	9.27	1.70	2.09	48.21	30.80	2.43	5.50	0.35	0.33	24.94	57.7	
Do. Ambala	10.25	1.00	3.06	42.38	30.88	3.23	9.10	0.60	0.44	15.05	54.0	
Do. Do.	10.06	2.46	11.16	38.12	26.32	9.81	2.07	2.03	1.70	3.92	72.2	
Do. Do.	10.34	1.51	3.12	43.08	32.83	3.56	4.66	0.64	0.50	15.21	55.6	
Do. Meerut	7.01	1.46	2.45	46.18	30.22	1.78	10.90	..	0.39	20.22	56.0	
Do. Do.	6.62	1.32	1.67	47.60	27.82	2.27	12.61	..	0.27	30.88	55.2	
Do. Do.	6.55	1.97	1.97	48.85	30.12	1.90	9.24	..	0.32	26.84	58.2	
Do. Do.	9.27	1.29	2.77	50.53	29.69	2.19	4.26	0.46	0.44	19.31	60.7	
Hay (<i>Cynodon dactylon</i>), Jabalpur	3.04	1.45	7.22	55.18	24.74	5.37	3.00	1.51	1.16	8.10	79.9	

GUIZOTIA ABYSSINICA, Cass.

English.—Niger seed.*Vernacular.*—Kala til, Ram til, Surguja.

Grain											
Sugarcane, Poona	6.15	41.14	20.07*	11.08	12.10	4.37	1.09	3.24	..	5.47	169.1
Do. Lucknow	8.43	38.20	19.25*	11.49	15.19	4.36	3.08	3.08	..	5.16	155.1
Do. Poona	4.88	38.03	10.31	17.47	9.20	6.69	4.42	3.19	3.09	5.43	169.8
Do. Sangor	7.70	9.32	29.04	28.05	14.70	7.04	2.35	4.97	4.78	1.68	127
Oil cake											
Sugarcane seed cake, Poona	7.42	9.30	38.56*	25.48	10.03	6.25	2.96	6.17	..	1.52	145.1

*HELIANTHUS ANNUUS, Linn.**English.*—Sunflower.*Vernacular.*—Surajmukhi.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
312 1914	Belgaum	8.38	7.35	18.02	57.87	1.06	4.23	2.19	3.05	2.88	4.13

*HORDEUM VULGARE, Linn.**English.*—Barley.*Vernacular.*—Jav.

Laboratory No.	Description of Samples	Grain									
		% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
164 1893	Local Cawnpore white,	13.71	1.80	8.29*	70.32	3.49	1.76	0.60	1.33	..	8.08
165 1893	Local Cawnpore black,	12.55	1.03	7.73*	60.71	5.63	0.85	1.00	1.24	..	9.29
166 1893	Chocolate, Cawnpore	12.79	1.97	8.24*	73.23	1.73	1.89	0.15	1.32	..	9.44
168 1893	White huskless, Cawnpore	12.18	1.83	7.92*	74.12	2.10	1.00	0.85	1.26	..	9.89
4 1898	Local Cawnpore black,	11.85	1.84	8.04*	72.65	3.24	1.90	0.39	2.29	..	9.36
423 1900	Local Cawnpore white,	11.40	1.83	6.62	73.52	4.29	1.72	0.62	1.17	1.05	10.33
424 900	White huskless, Cawnpore	11.44	1.63	12.50	70.44	1.80	1.05	0.19	2.13	2.00	1.94
7 1911	Military Farm, Agra	9.32	2.46	8.38	71.41	5.67	1.51	1.22	1.30	1.34	9.29
192 1913	Crushed barley, Peshawar	8.71	1.89	9.23	73.16	4.13	1.80	1.05	1.55	1.48	8.40
280 1914	Kirkee	10.32	2.26	7.73	73.02	4.49	1.71	0.47	1.31	1.24	10.12
291 1914	Ruk	9.38	2.19	8.81	69.72	5.37	2.39	2.14	1.46	1.41	8.40
296 1914	Quetta	10.48	2.12	8.61	70.43	5.27	2.00	1.10	1.38	1.36	8.85

HORDEUM VULGARE, *Linn.*—contd.*English.*—Barley.*Vernacular.*—Jav.

Description of sample	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Feed units
				<i>Meat</i>							
Calcutta	10.64	2.42	15.48	70.27	1.07	1.87	0.25	2.39	2.18	5.63	119.0
				<i>Bhusa</i>							
Calcutta	7.93	..	4.00	41.45	34.82	5.55	6.25	..	0.64	10.36	11.5
Do.	12.07	1.58	7.81	39.99	24.56	9.19	5.00	1.23	1.25	3.52	135.0
				<i>Green fodder</i>							
Green barley, Punjab	79.66	0.45	2.46	8.20	6.54	2.14	0.55	0.46	0.40	3.76	1.5
Green barley, dry state	10.31	1.98	10.85	36.16	28.84	9.11	2.12	2.03	1.76	10.75	68.2
Green barley (dried)	3.62	1.54	5.81	43.20	34.25	8.47	3.05	1.40	0.93	8.05	61.6

IPOMEA BATATAS, *Lamk.**English.*—Sweet Potato.*Vernacular.*—Alua, Sakarkand, Ranga-alu, Ratalu.

Tibbia, red	9.50	1.64	1.57	82.26	1.64	3.35	0.01	0.31	0.25	54.79	90.3
Moula, white	8.30	0.22	1.66	83.54	1.95	3.56	0.03	0.33	0.28	51.46	89.7
Bishunka, flesh-coloured	7.67	0.75	1.55	85.01	1.46	2.62	0.04	0.29	0.25	53.34	91.7
Gajera, red	7.59	0.92	2.29	83.60	1.46	4.01	0.04	0.44	0.37	57.17	91.7
Panma, white, very big	6.50	1.03	5.40	80.54	1.92	1.92	0.09	1.17	0.95	15.94	96.6
Panma, white, very big	6.16	1.23	1.87	85.40	2.05	3.19	0.10	0.39	0.30	47.18	94.2
Panma, white, very big	5.05	1.23	2.77	86.00	1.76	3.06	0.13	0.49	0.44	32.07	96.6
Panma, white, very big	7.26	1.27	2.59	84.09	1.78	2.91	0.16	0.33	0.41	33.37	93.7
Panma, white, very big	4.86	1.36	2.48	86.35	1.76	3.09	0.10	0.57	0.40	36.00	96.6
Panma, white, very big	5.22	1.42	3.41	84.47	2.06	3.32	0.10	0.70	0.55	29.10	96.6

*LATHYRUS SATIVUS, Linn.**English.—Chickling-Vetch.**Vernacular.—Khesari, Lakh, Lang, Teora.*

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Protein content
107 L 1899	Poona . . .	7.89	0.70	24.69	57.98	Grain 4.28	3.18	1.19	4.21	3.95	2.42	11
50 L 1899	Poona . . .	6.10	5.00	9.75	45.39	Bhusa 19.38	9.49	4.91	1.99	1.56	5.81	11
265 L 1899	Do. . . .	11.08	2.93	9.25	43.03	20.57	10.40	2.68	1.68	1.32	5.50	11

*LENS ESCULENTA, Moench.**English.—Lentil.**Vernacular.—Masur.*

					Grain							
103 L 1899	Poona . . .	8.03	1.06	23.00	61.14	2.42	3.54	0.81	3.94	3.68	2.76	11
273 L 1902	Masur bhusa . .	10.23	1.80	4.37	50.03	21.36	10.82	1.39	0.66	0.70	12.39	11

*LINUM USITATISSIMUM, Linn.**English.—Linseed.**Vernacular.—Aisi, Masina, Tisi.*

					Seed							
94 L 1899	Brown variety, Poona	4.97	37.47	20.92	26.24	5.69	3.96	0.84	3.71	3.35	6.37	17
426 L 1900	Brown variety, Cawnpore	6.62	43.16	15.00	26.01	4.94	3.87	0.80	2.87	2.40	8.05	17
307 L 1914	Mhow	3.56	41.34	17.45	26.43	5.71	3.82	1.69	2.99	2.79	6.99	18

*LINUM USITATISSIMUM, Linn.—conold.**English.—Linseed.**Vernacular.—Alsi, Masina, Tisi.*

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and Silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
Linseed cake . .	21.71	2.46	27.19	32.46	6.43	6.67	3.09	4.60	4.35	1.40	106.6
Do. . .	10.45	9.42	26.69	40.26	6.32	5.47	1.39	4.35	4.27	2.32	130.5
Do. . .	16.24	8.90	30.44	32.39	4.90	6.65	1.48	5.05	4.87	1.74	130.7
Do. . .	8.63	11.72	26.75	30.08	6.06	5.79	1.37	4.28	4.11	2.49	135.0
Do. Aden	7.77	11.59	27.22	26.04	2.85	10.00	4.44	6.41	5.96	1.42	148.1
Do. Mhow	8.58	10.57	30.72	36.73	6.72	5.33	1.35	5.25	4.92	1.99	140.0
Linseed cake, Jubbulpore	8.70	13.19	27.02	37.59	6.50	5.82	1.50	4.80	4.52	2.51	138.1

*MEDICAGO SATIVA, Linn.**English.—Lucerne, Alfalfa.**Vernacular.—Vilayti-gawuth.*

				<i>Green fodder</i>							
Poons . . .	77.75	0.76	3.00	11.89	3.74	2.73	0.11	0.71	0.48	4.55	21.29
Do. . . .	78.32	0.75	3.61	11.21	3.35	2.44	0.12	0.61	0.61	8.40	22.61
Baled, Quetta	2.14	3.32	15.48	46.30	17.70	11.83	2.23	2.98	2.48	3.49	99.8
Dried in country fashion, Quetta	5.00		11.71	43.87	27.95	8.10	0.47	2.10	1.37	4.40	80.4

*MELILOTUS PARVIFLORA, Desf.**Syn.—TRIFOLIUM INDICUM.**English.—Senji.*

				<i>Green fodder</i>							
Punjab . . .	84.40	0.36	2.69	6.16	4.13	1.87	0.39	5.15	0.43	2.60	13.8
Dry state . . .	10.00	2.08	15.52	35.54	23.83	10.79	2.25	2.97	2.47	2.60	79.5

MISCELLANEOUS.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Feed value
<i>Mixed rape and cotton cake</i>												
784 1902	Lahore . . .	0.79	8.21	26.50	10.07	10.86	3.23	1.34	4.27	4.24	2.22	1
237 1907	Do.	9.10	7.46	22.06*	40.54	13.07	5.50	1.43	3.53	..	2.61	11
<i>Mixed groundnut and niger seed cake</i>												
17 1902	Poona	7.32	9.12	42.06	25.42	8.19	0.45	1.44	6.07	6.73	1.01	16
61 1902	Nasik	9.44	8.14	29.01	28.52	11.17	0.89	2.90	4.98	4.79	1.38	12
<i>Mixed oil cake</i>												
840 1904	Hyderabad, Sind	5.87	11.12	31.91	35.68	8.16	0.07	1.49	5.60	5.10	1.92	11
212 1906	Ambala . . .	9.47	9.56	28.61	34.79	9.99	1.87	1.23	9.25	4.61	1.99	16
213 1906	Do.	8.78	10.23	28.35	35.83	9.04	5.93	1.83	5.02	4.54	2.09	10
<i>Priestly pear</i>												
375 1902	Poona	16.06	..	2.94*	..	..	21.81	0.59	0.47	..	..	..
<i>Molasses-cit.</i>												
72 1903	Lucknow . . .	13.46	..	1.30	70.74	7.96	5.98	0.56	..	0.21	54.42	7
<i>Mixed gram and barley</i>												
60 1911	Muttra	9.49	2.74	12.71	67.03	5.40	1.02	0.71	2.28	2.03	3.07	10
<i>Mixed Bhunga</i>												
376 1909	Dargal Alahabad	10.38	3.73	4.64	61.32	14.93	3.03	1.77	1.72	0.77	14.44	8
100 1912	Nowshera . . .	6.01	1.42	3.08	44.40	23.89	4.28	10.02	0.57	0.50	15.48	1
102 1912	Do.	4.58	1.36	3.34	45.79	31.77	4.18	8.98	0.50	0.53	14.65	3
159 1916	Sialkot	1.28	1.16	2.68	48.12	34.80	2.05	9.91	..	0.48	18.91	5

ORYZA SATIVA, Linn.

English.—Paddy, Rice.*Vernacular.*—Dhan, Dangar, Bhatta, Chaval, Nelli.

Description of Samples		% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
Grain undecorticated												
Pateha Madras	Bhoga,	12.87	2.38	7.07	04.06	7.21	1.39	5.02	1.18	1.13	9.83	87.7
Chandanchur,	Madras	11.72	2.25	5.82	06.83	7.78	1.30	4.30	1.08	0.93	12.37	87.0
Bhogantara, Backor-		13.82	2.01	6.09	62.16	0.64	1.13	5.21	1.03	0.96	11.14	82.3
Safeda, Punjab	Jalsabad,	12.73	1.88	6.44	64.47	8.29	1.35	4.84	1.05	1.03	10.68	85.3
Khosra, Punjab	Amritsar,	12.64	2.08	5.44	65.84	7.90	1.45	4.65	0.95	0.87	12.08	84.6
Danskokoa, long		12.87	2.05	6.06	65.81	8.07	1.54	3.60	1.07	0.97	11.64	86.1
steamed, Assam												
Ranga Ahu, Assam		12.92	1.78	7.38	63.42	8.29	1.50	4.80	1.28	1.18	9.15	86.3
Rosangh, Madras	Godavari,	11.85	2.25	4.82	65.06	0.28	1.57	4.57	0.97	0.77	14.70	83.3
Taru of nataya dhan		11.26	1.13	3.60*	31.81	31.38	1.58	19.15	0.59	..	0.30	43.0
Konda of Malaya dhan		13.64	1.65	6.81*	33.09	19.29	3.20	16.23	1.09	..	6.30	60.2
Konda of Kulia dhan		12.76	1.36	4.81*	38.45	24.87	2.50	13.25	0.77	..	8.64	53.9
Matwa of rice		13.60	2.20	6.75*	34.25	25.13	3.37	14.50	1.08	..	5.82	56.6
Grain decorticated												
1. Fine winter, Bengal		12.46	0.94	6.38	79.25	0.18	0.69	0.19	1.33	1.02	12.76	97.6
1. Coarse Burdwan winter,		12.00	1.26	6.44	78.46	0.23	0.95	0.66	1.06	1.03	12.63	97.7
1. Basmati of Kandi, Gurdaspur		11.28	0.80	5.50	80.81	0.23	0.83	0.53	1.04	0.88	15.03	96.6
1. Bhara, Gurdaspur, Punjab,		10.90	1.04	5.75	80.45	0.58	0.84	0.74	0.93	0.92	14.35	97.1
1. Dahua, Ganjam, Madras		11.31	1.03	6.69	78.50	0.27	0.79	1.30	1.15	1.07	12.09	97.8
1. Coarse Ganjam paddy,		11.56	0.59	6.13	79.08	0.36	0.81	0.57	1.06	0.98	13.27	96.8

ORYZA SATIVA, Linn.—contd.

English.—Paddy, Rice.

Vernacular.—Dhan, Dangar, Bhatta, Chaval, Nelli.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
<i>Grain decorticated—concd.</i>											
458 1900 L	Panktekos, Assam .	13.75	0.91	7.25	76.77	0.18	1.05	0.09	1.25	1.16	10.86
460 1900 L	Ranga Abu, Assam	13.73	1.23	0.32	73.35	0.62	1.54	0.16	1.54	1.49	8.17
611 1902	Rice, cleaned .	13.66	1.17	6.43*	78.63	0.25	0.86		1.03	..	12.08
612 1902	Do. Kanki .	13.31	1.29	7.62*	76.55	0.40	0.85		1.22	..	10.41
	Hemcha, Sabour .	12.45	2.44	8.64	74.44	0.57	1.46		1.36	1.36	9.27
	C. P. Aus, Bankipore	12.23	2.10	7.56	75.28	0.95	1.74		1.21	1.20	10.63
	Kalamdan, Dumraon	11.14	2.40	6.66	78.36	0.50	1.54		0.97	0.97	13.24
	Badshahbhog Do.	11.44	2.59	8.63	74.60	0.90	1.84		1.38	1.37	9.38
<i>Rice, polished</i>											
	Hemcha, Sabour .	10.76	0.60	8.25	80.26	0.13	0.60		1.32	1.31	9.90
	C. P. Aus, Bankipore	11.60	1.14	7.39	78.91	0.05	0.91		1.16	1.16	10.90
	Kalamdan, Dumraon	11.83	0.85	5.60	80.42	0.35	0.86		0.91	0.90	14.48
	Badshahbhog, Do.	12.08	0.99	8.63	77.37	0.10	0.83		1.38	1.38	9.22
<i>Rice dust</i>											
274 1914	Rice sweepings, Kirkee	9.64	2.59	9.26	74.17	1.51	1.74	1.09	1.59	1.48	8.65
319 1915	White rice dust, Kasauli	11.07	3.05	11.90	60.42	1.04	5.83	5.79	2.22	1.90	5.66
<i>Rice bran</i>											
566 1900 L	Bran mixed with husks, Madras	7.98	7.06	5.50	32.98	27.44	3.40	15.64	1.01	0.88	8.45
567 1900 L	Bran mixed with husks, Madras	8.44	9.56	5.94	35.53	22.91	3.71	13.91	1.06	0.96	9.46
<i>Rice husk</i>											
364 1900 L	Fine winter, Bengal	9.33	5.43	4.81	40.15	22.14	2.73	15.41	1.06	0.77	16.94
384 1900 L	Coarse winter, Burdwan	6.7	3.04	4.12	34.32	25.31	2.57	23.91	0.74	0.66	16.02

ORYZA SATIVA, Linn.—concl'd.

English.—Paddy, Rice.*Vernacular*.—Dhan, Dangar, Bhatta, Chaval, Nellu.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter.	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
<i>Rice husk—concl'd.</i>											
Basmati of Kandl, Gurdaspur, Punjab	7.67	3.59	4.06	40.95	25.04	3.30	15.89	0.66	0.65	15.12	60.1
Rasangi, Godavari, Madras	8.76	1.24	4.19	30.86	32.12	2.14	20.60	0.75	0.67	8.05	44.4
Daluva, Madras	8.50	1.38	3.13	33.54	29.67	2.48	21.24	0.53	0.49	11.73	44.8
Daluva, Madras, after boiling	9.59	1.39	3.32	33.89	29.96	2.12	19.73	0.50	0.53	11.17	45.7
Husk of Basmati rice	9.74	0.59	3.44*	25.22	32.98	1.99	26.01	0.65	..	8.31	35.3
Do. Parusa rice	10.16	0.87	2.75*	31.37	33.04	1.49	20.32	0.44	..	12.13	40.5
<i>Straw</i>											
Fine winter, Bengal	0.46	0.95	1.81	40.54	30.30	6.23	10.71	0.33	0.29	23.61	47.4
Coarse winter, Bengal	0.51	1.25	2.25	40.89	30.64	5.01	10.45	0.38	0.36	19.45	49.6
Patcha bhogo, Madras	9.08	1.34	3.19	39.29	27.74	3.19	14.17	0.53	0.51	13.28	50.6
Kohala, Madras	12.09	1.79	3.54	42.80	24.08	2.61	12.89	0.72	0.57	10.25	56.1
Kataribhog, Dinajpur	11.14	1.08	3.19	39.95	28.64	3.47	12.53	0.59	0.51	13.20	50.6
Basmati rice straw	9.07	1.57	4.87*	40.52	28.91	4.25	10.81	0.78	..	9.06	56.6
Dihaka dhan	0.75	0.52	2.31*	29.55	38.66	1.26	17.25	0.45	..	10.94	37.0

PANICUM CRUS-GALLI, Linn.; VAR. FRUMENTACEUM, Trimen.

English.—Poorman's millet.*Vernacular*.—Sama, Banti.

<i>Grain</i>											
Food	7.72	4.39	7.06	67.56	7.44	1.70	4.13	1.18	1.13	11.00	96.2

PANICUM MAXIMUM, Jacq.*Syn.* PANICUM JUMENTORUM, Pers.*English.*—Guinea grass.*Vernacular.*—Gini gawat.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	
50 1899 L	Poona	63.38	0.84	1.88	Green fodder 419.36		8.79	2.60	3.15	0.41	0.30	11.02
52 1899 L	Do.	71.55	1.05	2.62	15.71	5.73	1.87	3.40	0.53	0.42	6.46	

PANICUM MILIACEUM, Linn.*English.*—Common millet.*Vernacular.*—Varagu, China, Vari.

					<i>Grain</i>						
88 1899 L	Poona . . .	7.95	4.11	6.81	67.26	7.63	2.16	4.08	1.18	1.09	11.20
97 1899 L	Do. . . .	8.57	5.09	9.38	64.21	6.30	2.50	3.95	1.52	1.50	6.00
45 1900 L	Punjab . . .	9.99	4.52	7.94	64.13	8.24	1.83	3.35	1.39	1.27	9.39
633 1902	Vari . . .	12.62	4.49	7.51*	64.19	8.99	2.49		1.17	..	10.17
636 1902	Vari cleaned grain .	12.47	1.44	7.82*	76.66	0.39	1.20		1.27	..	10.08
634 1902	Chaff before grinding	12.54	3.04	10.12*	55.80	8.72	8.88		1.62	..	6.41
635 1902	Do. after do. .	12.10	6.54	7.18*	45.76	21.65	6.77		1.15	..	8.47
					<i>Chaff</i>						

*PANICUM MILIARE, Lamk.**English.*—Little millet.*Vernacular.*—Shamai, Sava, Kutki, Gondula, Kungu.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Gum and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
				<i>Grain</i>							
Sava	12.95	5.33	9.06*	60.93	7.57	4.13		1.45	..	8.12	94.9
Sava cleaned grain	12.92	1.79	9.50*	74.65	0.35	0.79		1.52	..	8.29	102.9
				<i>Chaff</i>							
Sava chaff before grinding	12.25	3.94	9.05*	53.60	13.76	7.39		1.45	..	9.61	89.1
Sava chaff after grinding	11.11	9.76	7.18*	59.13	21.41	11.41		1.15	..	8.57	81.5

*PAPAYER SOMNIFERUM, Linn.**English.*—Poppy.*Vernacular.*—Kashkash, Postadana.

	<i>Seed</i>										
Sample	1.07	48.95	17.75	16.99	5.09	6.85	0.30	2.97	2.84	7.30	183.7

*PASPALUM SCROBICULATUM, Linn.**English.*—Kodo millet.*Vernacular.*—Kodon, Kodra, Harik.

	<i>Grain</i>										
Procca	8.61	3.36	5.81	70.06	8.47	1.34	2.95	1.00	6.93	13.32	93.0
Kodra cleaned	12.84	1.29	8.06*	75.28	0.55	1.98		1.29	..	9.71	98.7
Kodra	11.71	2.85	8.75*	64.72	9.14	5.83		0.92	..	8.15	90.7
Kodra No. 1	10.21	3.29	6.34	68.00	3.20	1.98	1.93	1.09	1.01	11.62	82.1

PASPALUM SCROBICULATUM, Linn.—conold.

English.—Kodo millet.

Vernacular.—Kodon, Kodra, Harik.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
65 1903	Kolaba No. 2	8.46	3.41	6.36	66.41	10.95	2.03	2.36	1.07	1.02	11.07
68 1903	Ratnagiri	9.07	3.94	5.46	70.77	9.27	0.80	1.09	0.99	0.87	14.80
70 1903	Do.	8.71	2.90	6.31	71.02	8.92	1.24	0.90	1.04	1.01	12.31
71 1903	Do.	8.83	3.17	6.19	69.75	9.32	1.15	1.59	1.14	0.99	12.45
73 1903	Do.	8.04	3.13	5.81	68.69	11.65	1.59	1.29	1.00	0.93	13.06
75 1903	Do.	7.43	2.46	5.31	69.47	9.98	2.48	2.87	0.88	0.85	14.04
814 1902	Kodra husk after grinding	10.56	3.28	4.87*	71.10	12.19	8.00		0.78	..	16.15

Pennisetum typhoideum, Rich.

English.—Bulrush millet, Spiked millet.

Vernacular.—Bajra, Kambu.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
81 1899	"Mahadodhri," Poona	8.05	5.36	9.83	74.26	0.60	1.60	0.25	1.72	1.58	8.78
84 1899	"Bhownugri," Poona	8.60	5.27	9.27	73.94	0.86	1.68	0.18	1.58	1.41	9.71
91 1899	"Awmed," Poona	8.09	5.50	10.00	72.99	0.62	2.12	0.68	1.70	1.60	8.66
95 1899	Nadiad, Poona	8.87	5.08	8.62	74.75	0.90	1.59	0.19	1.47	1.38	10.60
98 1899	Local variety, Poona	8.86	5.75	8.12	74.11	0.93	1.74	0.39	1.34	1.30	10.30
43 1900	Punjab	10.08	4.93	11.12	71.07	0.76	1.64	0.40	1.86	1.78	7.41
626 1902	Bajra	14.30	5.16	8.75*	67.87	1.34	2.55		1.40	..	9.11
627 1902	Purchased	12.84	3.88	8.43*	70.72	1.39	2.74		1.35	..	9.40
628 1902	Home made	13.54	3.74	8.75*	71.19	1.30	1.39		1.40	..	9.11

*PHASEOLUS ACONITIFOLIUS, Jacq.**English.*—Aconite-leaved kidney bean.*Vernacular.*—Moth, Matti-kalai, Bhringga.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
<i>Grain</i>											
1. Pondi . . .	8.59	1.07	22.50	58.85	4.24	3.99	0.76	4.01	3.60	2.73	117.8
1. Punjab . . .	7.46	0.83	20.50	63.55	3.83	3.58	0.25	3.75	3.28	3.10	116.9
1. Bhubaija, Assam .	13.78	0.67	17.00	59.34	5.73	3.43	0.05	2.97	2.72	3.52	103.5
<i>Dhusa</i>											
Lahore . . .	8.78	2.80	12.13	47.12	14.20	10.48	4.43	2.21	1.94	4.42	84.5
<i>Green fodder</i>											
1. Punjab . . .	74.70	0.89	3.20	12.00	4.99	2.95	1.27	0.68	0.51	4.39	22.2
Dry state . . .	10.00	3.16	11.36	42.60	17.71	10.47	4.70	2.43	1.82	4.39	78.9

*PHASEOLUS LUNATUS, Linn.**English.*—Lima bean, Duffin bean, Burma bean.*Vernacular.*—Pegyi, Banharbati.

From Tempesby & Co.	9.13	1.15	15.50	65.82	1.71	3.69	0.60	2.85	2.48	4.42	107.5
Burma . . .	10.00	1.15	12.03	67.94	4.17	3.86	0.10	2.60	2.03	5.56	102.5
Do. . . .	9.53	0.89	14.56	66.80	4.15	3.78	0.29	3.12	2.33	4.73	105.4
Burma (Sagaing District).	10.29	1.28	14.06	66.37	3.83	3.98	0.19	3.08	2.55	4.93	104.7
Burma (Pakoku District).	10.03	1.22	12.69	67.89	3.76	4.23	0.18	3.09	2.03	5.57	102.7
From Morrison and Downs.	13.60	1.32	11.35	65.41	4.86	3.66	0.10	2.65	1.82	6.00	96.8
Gilchrist & Co.	14.44	1.25	12.60	63.59	4.45	3.48	0.10	2.82	2.03	5.24	98.4

PHASEOLUS LUNATUS, *Linn.*—concd.*English.*—Lima bean, Duffin bean, Burma bean.*Vernacular.*—Peyi, Banbarbati.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
291 1903	Rangoon market	14.53	0.02	13.69	62.66	4.42	3.78	0.00	2.92	2.19	473
292 1903	Morrison and Downs	10.79	1.41	13.55	66.29	4.27	3.89	0.00	3.21	2.14	521
283 1903	Gillespie & Co.	16.02	0.92	11.87	63.09	3.65	3.56	0.00	3.06	1.89	549
284 1903	Rangoon market	16.97	0.95	12.19	62.56	3.70	3.63	0.00	3.06	1.95	582

PHASEOLUS MUNGO, *Linn.**Vernacular.*—Urid, Mash-kalai.

Grains											
100 1890	L Poona	8.14	0.09	18.50	59.11	4.33	4.51	4.42	3.21	2.96	340
50 1900	L Green Punjab variety	11.05	0.06	20.13	60.82	3.48	3.17	0.30	3.51	3.22	303
51 1900	L Black Punjab variety	9.69	1.13	22.81	50.36	3.27	3.54	0.29	3.75	3.65	272
185 1900	L "Black Madras grain"	9.07	0.82	21.81	50.64	3.77	3.24	0.75	3.77	3.49	262
479 1900	"Matimbi," Assam	10.99	0.83	20.50	59.03	4.79	3.58	0.30	3.64	3.28	297
223 1903	Cawnpore	11.67	1.02	22.32	57.52	3.88	3.60	0.50	3.74	3.57	263
Bhusa											
186 1900	L Black grain bhusa, Madras	15.96	1.70	11.19	29.14	17.08	9.97	4.06	2.03	70	3.53
375 1902	Urid bhusa	9.89	1.13	6.13	41.86	32.58	7.03	1.38	1.30	0.68	722
41 1903	Lahore	8.97	2.56	14.50	44.11	10.62	8.87	10.37	2.48	2.32	345
333 1903	Cawnpore	10.92	1.91	8.94	35.82	11.47	9.57	21.27	1.54	1.43	450

*PHASEOLUS RADIATUS, Linn.**English.*—Green gram.*Vernacular.*—Mug, Mung.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
				<i>Grain</i>							
1. Poona	9.48	1.83	23.56	59.29	4.42	4.02	0.30	4.03	3.77	2.57	119.9
1. Nang, Punjab	10.02	0.93	22.91	58.94	3.38	3.71	0.05	3.76	3.67	2.60	118.0
1. Pevara, Godavari	11.64	0.79	20.82	58.72	4.04	3.99	0.90	4.17	3.33	2.91	112.7
1. Muro, Ganjam, Madras	9.79	0.86	20.12	61.67	3.71	3.32	0.23	3.73	3.22	3.16	111.1
1. Gampore	11.00	0.56	18.69	62.19	3.43	3.22	0.51	3.41	2.69	3.43	111.3
				<i>Blaze</i>							
1. Rajahmundry, Madras	13.30	2.52	19.83	49.35	18.66	10.33	3.91	1.85	1.71	4.24	73.9
1. Murutusa	9.27	2.03	8.56	39.15	18.76	8.77	13.16	1.43	1.37	6.15	65.9
1. Lahore	9.50	2.43	11.81	45.93	14.81	10.60	4.99	2.10	1.89	4.36	84.5

*PISUM ARVENSE, Linn.**English.*—Grey or Field Pea.*Vernacular.*—Karain, Maitar rewari.

1. Gampore	10.56	0.93	20.12	<i>Grain</i>							
				61.34	4.46	2.54	0.05	3.45	3.22	3.16	114.6
1. Field Pea (Fodder)	4.56	2.12	9.93	<i>Green fodder</i>							
				44.84	23.48	9.11	0.66	3.35	1.59	5.4	75.7

*PISUM SATIVUM, Linn.**English.—Garden Pea.**Vernacular.—Bara-mattar, Bahtahna.*

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
<i>Grain</i>											
1180 1893 L	White, Cawnpore .	12.05	1.27	24.12*	54.44	5.47	2.65	0.00	3.84	..	2.38 E
121 1893 L	Black, Do. .	11.27	1.47	21.67*	52.47	6.67	3.30	0.15	3.95	..	2.22 E
80 1899 L	Vatane, Poona .	7.89	1.40	20.06	62.12	5.69	2.79	0.05	3.38	3.21	3.26 H
420 1900 L	Do. Cawnpore .	11.42	1.17	21.00	57.84	5.43	3.05	0.09	3.87	3.36	2.68 H
637 1900 L	Do. Jubbulpore	11.05	1.06	19.00	61.86	3.26	2.99	0.78	3.21	3.04	3.58 H
<i>Brass</i>											
58 1899 L	Poona . . .	7.27	3.02	11.75	42.43	19.36	9.05	6.52	2.49	1.88	1.20

*RICINUS COMMUNIS, Linn.***English.—Castor.**Vernacular.—Arand, Bherenda.*

<i>Seed</i>											
430 1900 L	Large variety, Cawnpore.	7.43	45.28	14.00	10.59	19.58	2.04	0.18	2.36	2.24	8.20 H
<i>Cake</i>											
63 1902	Surat . . .	11.83	7.18	30.06	25.02	19.69	5.57	0.65	5.05	4.61	1.38 H
294 1902	Bronch . . .	7.55	7.07	29.31	29.63	19.73	5.57	1.14	4.82	4.69	1.57
326 1902	Surat . . .	12.37	4.50	27.56	18.08	29.71	6.84	0.94	5.05	4.41	1.43

* Although not used for feeding purposes, this is included here for the sake of comparison with edible oil cakes.

SACCHARUM OFFICINARUM, *Linn.**English.*—Sugarcane.*Vernacular.*—Ukh, Ak, Ganna, Oos.

Description of samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter.	% Sand and siliu	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
Sugarcane (folded), Lucknow	31.85	1.03	1.01	37.76	Cane 21.56	2.23	4.56	0.19	0.16	39.73	42.0
Molasses, Lucknow	11.29	0.00	1.52	65.84	Molasses 11.78	4.97	1.60	..	0.21	4.53	69.6
Sugarcane leaf, Bangalore	7.27	1.47	3.12	47.38	Leaf 34.40	4.27	2.09	0.55	0.59	10.27	58.1

SESAMUM INDICUM, *DC.**English.*—Gingelly, Sesame.*Vernacular.*—Til.

		Seed									
L	White var., Ahmednagar.	4.48	48.13	22.50*	14.05	4.49	5.59	0.37	3.60	..	5.54 190.6
L	Black var., Nadiad.	5.43	46.50	25.81*	9.06	6.51	6.03	0.66	4.13	..	4.50 189.8
L	Red var., Ahmednagar.	5.37	46.20	21.03*	15.87	4.18	6.00	1.35	3.37	..	5.81 181.0
L	Red var., Poona	4.18	49.12	20.37	11.16	2.93	6.65	2.59	3.24	3.26	6.24 187.9
L	Black var., Do.	4.14	47.60	18.12	18.56	4.14	6.85	0.59	3.11	2.90	7.07 182.9
L	White var., Do.	4.21	51.96	18.06	11.62	4.49	6.28	0.38	2.89	2.89	7.43 189.7
L	Black var., Punjab	5.57	52.27	17.94	13.36	3.87	6.58	0.51	3.06	2.87	7.44 188.8
L	White var., Do.	6.53	48.53	21.37	13.96	3.56	6.56	0.49	3.68	3.42	5.88 188.7
L	Black var., Cawnpore	4.82	47.11	20.00	15.86	5.20	6.34	0.07	3.39	3.20	6.21 183.6

SESAMUM INDICUM, DC.—conold.

English.—Gingelly, Sesame.

Vernacular.—Til.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Percent water
432 1900	L White var., Chawpore	4.01	48.00	10.69	15.60	Seed—could 5.15	6.82	0.33	3.36	3.15	0.40	25.0
431 1900	L Do. Do.	4.51	48.45	10.00	16.22	4.33	6.60	0.89	3.23	3.04	0.72	16.0
822 1902	Til seed	5.67	44.56	19.00*	13.51	4.74	12.52	0.00	3.04	..	0.11	15.1
160 1909	L Red var., Poona	10.39	14.12	29.46	29.91	3.83	8.52	3.72	5.81	4.71	2.12	10.0
170 1908	L Black var., Do.	10.07	10.90	31.66	23.59	10.30	5.77	1.71	6.15	5.06	1.73	17.0
15 1902	Oil cake, Do.	9.05	15.14	36.51	25.00	3.08	8.95	1.59	0.03	5.81	1.65	11.2
62 1902	Do. Surat	11.20	10.90	32.63	26.09	7.83	8.66	1.69	5.60	5.38	1.62	15.4
66 1902	Do. Khandesh	7.36	11.87	29.88	31.21	8.63	9.50	1.49	5.41	4.78	1.96	12.4
90 1902	Do. Punjab	6.95	8.08	37.31	29.80	3.67	11.50	2.60	6.29	5.07	1.80	18.4
263 1902	Til oil cake, Saugor	6.50	7.22	32.56	36.80	4.18	10.09	2.65	5.49	5.21	1.44	19.1
293 1902	Do. Broach	8.34	15.13	34.44	24.87	2.98	10.70	3.45	5.88	5.51	1.73	16.3
327 1902	Do. Surat	13.41	6.41	55.31	28.16	6.81	9.31	0.59	6.16	5.03	1.32	15.0
518 1902	A Do. Raipur	12.69	11.29	33.18	25.45	3.61	10.50	2.28	5.63	5.31	1.55	19.1
535 1902	Do. Rodputti	15.13	8.36	30.31	30.30	3.00	10.86	2.04	5.13	4.85	1.43	15.3
522 1902	Do. Sambalpur.	14.54	8.62	33.43	27.51	3.96	0.50	2.25	5.07	5.35	1.42	12.3
595 1902	Do. Chanda	16.23	3.60	35.37	27.50	4.40	11.46	1.44	6.07	5.06	1.01	18.9
844 1902	Do. Madras.	20.29	6.49	48.38	13.94	2.55	6.76	1.59	7.79	7.74	0.60	19.0
1 1911	Do. Agra	7.40	8.50	36.33	31.58	4.09	9.96	1.22	6.15	5.82	1.41	10.0
326 1914	Do. Jubbulpore.	7.74	17.12	33.18	24.07	2.25	0.65	4.99	5.55	5.31	1.91	19.0
4 1915	Do. Cawn-pore.	10.07	16.32	41.68	22.35	2.34	6.77	0.52	7.19	6.66	1.44	16.2

COMPOSITION OF SOME INDIAN FEEDING STUFFS

51

SETARIA ITALICA, Beauv.

English.—Italian millet.

Vernacular.—Rala, Kangni.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
					Grain						
"Rala," Poona	7.75	4.54	10.37	69.19	5.22	1.44	1.49	1.68	1.66	7.68	108.5
"Kangni," Punjab	10.11	4.90	10.50	63.81	6.29	1.74	2.59	1.75	1.68	7.10	102.5
"Swauz," Punjab	10.25	4.53	10.62	65.37	6.18	2.25	1.00	2.07	1.70	7.09	102.8
W. "Rai-Seh," Hill district, Assam.	11.96	3.46	10.25	62.79	6.23	2.08	2.33	1.72	1.64	6.60	97.1
Rala grain (cleaned)	12.17	4.14	10.00*	63.48	8.64	1.97		1.60	..	7.30	98.8
					Chaff						
Rala chaff (before grinding).	12.48	2.81	9.37*	54.40	16.06	4.85		1.80	..	6.50	84.9
Rala chaff (after grinding).	13.26	5.18	6.87*	40.59	22.92	11.18		1.10	..	7.04	70.7
					Green fodder						
Kangni (fresh), Punjab.	76.79	0.54	2.08	10.08	6.37	1.82	2.32	4.81	3.32	5.41	16.6
Kangni Punjab. (dry).	10.00	2.00	8.07	39.11	24.71	7.02	9.00	1.86	1.28	5.44	64.6

SILAGE.

1. Andry silage, Nagpur	12.68	0.00	2.33	40.82	39.95	1.58	9.54	9.47	0.11	16.02	46.9
Maize silage (fresh State), Nagpur	81.87	0.21	0.77	9.44	5.50	1.10	1.11	0.17	0.12	12.93	11.9
Maize silage (air-dry)	7.66	1.07	3.93	48.02	28.06	5.60	5.66	0.90	0.63	12.84	10.5
2. Sorghum silage (fresh)	60.52	0.65	1.89	21.37	11.29	1.50	2.69	0.33	1.50	12.10	37.7
Sorghum silage (air-dry)	5.72	1.55	4.53	61.10	26.87	3.80	6.43	0.79	0.72	12.07	66.3
Silage of Eleusine farct.	4.60	2.53	4.25	53.74	24.71	4.52	5.65	1.03	0.68	14.01	70.7
Silage (fresh)	51.69	1.96	2.87	21.65	15.52	2.93	3.58	0.81	0.46	8.91	33.1
Silage	6.10	1.48	5.31	42.31	32.22	6.04	6.54	0.90	0.85	8.61	59.2

SORGHUM VULGARE, *Pers.**English.*—The Indian or Great Millet, Guinea corn.*Vernacular.*—Juar, Cholam, Janera.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
					<i>Grains.</i>						
23 1806 L	Juar grain, Nagpur	9.96	7.66	7.69	70.15	2.24	1.67	0.63	1.26	1.23	12.41
63 1806 L	Juar grain, (white fine), Surat	12.04	3.06	7.10	74.45	1.30	1.61	0.32	1.21	1.13	11.47
64 1808 L	Juar grain (white fine) (2nd class), Surat	11.55	3.50	6.00	76.70	0.95	1.24	0.05	1.05	0.98	14.12
65 1898 L	Juar grain (red cheap-grain), Surat	12.08	3.22	9.92	71.47	1.17	1.37	0.27	1.67	1.58	7.90
273 1899 L	Juar grain, "Khand," Poona	9.98	3.61	11.87	71.54	1.12	1.83	0.05	1.98	1.81	6.73
278 1899 L	Juar grain, "Nilwa," Poona	10.41	4.45	11.19	70.99	1.18	1.73	0.05	1.91	1.79	7.28
379 1899 L	Juar grain, "Dudh Mogta," Poona	10.21	4.13	10.19	71.90	1.22	2.11	0.24	1.74	1.63	7.79
230 1899 L	Juar grain, "Mal Dandi," Poona	8.76	3.47	9.57	74.20	1.75	1.92	0.33	1.65	1.63	8.59
281 1899 L	Juar grain, "Sundia," Poona	9.90	4.59	12.44	70.05	0.79	1.83	0.40	2.11	1.99	6.68
42 1900 L	Juar grain (brown), Punjab	11.53	3.16	8.94	71.88	2.09	1.90	0.70	1.49	1.43	8.65
56 1900 L	Juar grain (white), Punjab	12.04	3.13	8.19	73.44	1.37	1.64	0.19	1.34	1.31	9.88
404 1900 L	Juar grain (red), Gazipore	11.25	3.29	9.44	73.37	1.56	1.81	0.28	1.62	1.51	8.47
405 1900 L	Juar grain (white), Agra	11.71	3.84	7.99	72.99	1.36	1.82	0.29	1.34	1.27	10.34
408 1900 L	Juar grain (white), Cawnpore	11.87	3.58	8.19	73.46	1.66	1.64	0.10	1.39	1.31	9.07
407 1900 L	Juar grain (dwarf brown), Cawnpore	10.86	3.39	8.81	73.40	1.81	1.68	0.05	1.48	1.41	9.22
623 1902	Do. do.	14.41	3.23	8.31*	70.64	1.59	1.82	0.00	1.33	..	9.92
624 1902	Juar flour (Purchased)	14.29	2.53	8.25*	71.66	1.44	1.83	0.00	1.32	..	9.49
625 1902	Juar flour (Home made)	14.68	2.43	9.31*	70.33	1.39	1.86	0.00	1.49	..	8.15

SORGHUM VULGARE, *Pers.*—contd.*English.*—The Indian or Great Millet, Guinea corn.*Vernacular.*—Juar, Chola, Janera.

Description of samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Starch	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
				<i>Grain—concld.</i>								
Juar grain, Cawnpore	14.02	3.06	5.75	73.41	1.19	1.72	0.85	1.21	0.02	13.09	93.4	
Do. do.	13.33	3.04	7.44	72.70	1.22	1.78	0.40	1.10	1.29	10.70	98.9	
Do. do.	13.88	2.88	6.94	72.72	1.29	2.00	0.29	1.21	1.11	11.43	97.3	
				<i>Green fodder</i>								
Juar (sun-dried sample), Aligarh	8.35	0.09	4.10	47.85	33.59	3.28	2.74	0.70	0.67	11.42	58.3	
Juar (cropped green), Nagpur	69.76	0.00	0.55	14.74	11.90	1.17	1.88	0.11	0.09	26.80	16.1	
Juar (cropped ripe), Nagpur	67.02	0.00	0.61	16.42	12.78	1.32	1.62	0.17	0.10	26.66	18.0	
Juar (dead ripe), Nagpur	10.79	0.09	2.24	51.57	25.42	3.04	0.04	0.49	0.36	23.02	67.2	
Juar (cut in October), Cawnpore	56.10	0.00	3.10	29.65	15.32	2.23	2.54	0.56	0.50	6.66	28.4	
Juar (cut in March), Cawnpore	63.77	0.00	1.54	18.50	10.35	1.77	4.67	0.42	0.25	2.01	22.4	
Do. do.	48.78	0.00	2.01	25.31	15.02	2.10	5.88	0.43	0.32	12.50	30.3	
Juar (cut in March), Madras	80.24	0.46	1.21	9.71	0.13	1.00	1.14	0.23	0.19	8.99	13.0	
Juar (cut in March), Punjab	80.27	0.51	1.24	8.87	6.18	1.51	1.42	0.24	0.20	9.10	13.3	
Kerli (Juar) green, Ruk	3.75	1.42	4.28	52.61	30.50	5.11	2.33	1.04	0.68	13.06	66.9	
Kerli (Juar), Nilwa, Ruk	3.78	1.83	1.44	49.60	35.73	5.91	1.65	0.43	0.23	37.37	57.6	
				<i>Straw</i>								
Juar straw, Cawnpore	10.63	1.43	2.38	42.80	20.60	4.27	17.59	0.33	0.38	10.37	52.3	
Do. do.	13.09	2.43	2.56	45.58	23.75	4.06	7.93	0.51	0.41	10.99	58.4	
Do. do.	12.20	1.84	2.19	45.91	23.58	4.36	9.92	0.42	0.35	22.89	56.0	

SORGHUM VULGARE, *Pers.*—concd.*English.*—The Indian or Great Millet, Guinea corn.*Vernacular.*—Juar, Cholam, Janera.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
<i>Bhusa</i>											
0 L 1898	Juar Bhusa, Nagpur	12.61	0.00	2.24	45.95	25.42	3.22	10.56	0.48	0.36	20.31
174 L 1898	Juar Bhusa, "Sundhi" (not quite ripe), Poona	8.04	2.19	3.83	47.98	27.90	2.91	7.15	0.64	0.61	13.48
175 L 1898	Juar Bhusa, "Kowbi" (not quite ripe), Poona	7.85	2.11	2.29	46.27	31.38	3.15	7.15	0.41	0.37	22.12
148 L 1900	Juar Bhusa, Samalkota, Madras	7.63	3.09	4.50	44.67	21.64	3.42	15.05	0.81	0.72	11.51

SORGHUM VULGARE var. SACCHARATUS, *Pers.**English.*—Sugar Sorghum, Amber Cane.*Vernacular.*—Deo-dhan.

<i>Green fodder</i>											
18 L 1896	Deo-dhan (reaped green), Nagpur	70.96	0.00	0.81	12.14	12.57	1.23	2.29	0.13	0.13	14.64
20 L 1896	Deo-dhan (reaped ripe), Nagpur	57.15	0.00	1.22	10.17	18.13	1.29	3.04	0.26	0.19	15.71
20 L 1915	Deo-dhan, Karnal	7.36	1.90	3.70	52.15	21.12	3.88	2.89	0.68	0.59	14.07

TRIFOLIUM ALEXANDRINUM, *Linn.**English.* Egyptian clover.*Vernacular.*—Berseem.

12 1916	Green fodder	6.48	2.77	22.04	34.44	15.52	15.32	2.43	4.80	5.53	1.88
103 1916	Do	2.60	1.85	10.94	41.46	30.60	11.73	0.82	2.70	1.75	4.17

TRIFOLIUM RESUTINATUM, *Linn.**English.*—Persian clover.*Vernacular.*—Shaftal.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woolly fibre	% Soluble mineral matter	% Sand and Silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
Shaftal hay, Quetta.	15.86	2.19	14.10	39.98	13.80	12.88	1.19	2.48	2.26	3.19	80.7
Shaftal (from Usar spot), Quetta.	21.91	2.44	14.27	39.41	10.80	10.18	0.99	2.70	2.28	3.15	81.2
Shaftal (from normal area), Quetta.	22.15	2.43	13.56	38.80	10.58	11.70	0.76	2.63	2.17	3.27	78.8

TRITICUM VULGARE, *Vill.**English.*—Wheat.*Vernacular.*—Gehum.

<i>Grain</i>											
Heavy, bearded, Cawnpore	13.35	1.73	8.47*	73.08	1.57	1.75	0.65	1.56	..	0.10	98.0
Heavy, beardless, Cawnpore	13.19	1.60	9.75*	72.03	1.03	1.40	0.10	1.56	..	7.76	100.4
Small, Cawnpore	12.21	1.66	9.92*	72.68	1.75	1.80	0.00	1.59	..	7.71	101.6
Chakralli, Bengal, red hard	13.78	1.80	9.57	70.25	2.30	1.84	0.31	1.77	1.50	7.50	98.9
Medium, Banka, Bengal white, soft	16.11	1.75	9.44	68.55	2.35	1.62	0.18	1.62	1.53	7.69	96.5
Medium, Palatana, white, soft	14.26	1.91	10.10	65.54	2.61	2.35	2.04	1.76	1.63	6.65	95.8
"Muz-darnagar" Cawnpore white, soft	11.58	1.70	8.13	75.22	1.23	2.04	0.10	1.38	1.30	9.73	99.8
Banka, Cawnpore, white, soft	11.00	1.53	9.25	73.65	1.33	2.09	0.25	1.66	1.48	8.34	100.6
"Bait proof," Cawnpore, white, hard	9.94	1.50	9.25	75.96	1.50	1.80	0.05	1.57	1.43	8.59	102.8
Black, Malda, red, hard	13.82	2.20	10.06	68.76	2.43	2.26	0.27	1.73	1.61	7.34	99.4
Chakralli, Malda, red, hard	13.51	1.60	11.88	68.55	2.33	1.90	0.23	2.01	1.60	6.98	102.3

TRITICUM VULGARE, *Vill.*—contd.*English.*—Wheat.*Vernacular.*—Gehum.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
<i>Grain—cooled.</i>											
483 1900 L	"Jamali," Barb, Bengal, red, soft	14.26	1.88	10.69	68.25	2.30	2.15	0.47	1.82	1.71	0.79
491 1900 L	"Champururi," Darbhanga, red, soft	13.27	2.11	12.69	66.75	2.93	2.06	0.10	2.14	2.03	3.40
497 1900 L	"Dudhia," Patna, white, soft	13.86	1.82	10.00	69.44	2.71	2.03	0.14	1.73	1.80	7.05
505 1900 L	"Dudhia," Gaya, white, soft	13.73	1.74	10.63	68.53	2.07	2.22	1.08	1.85	1.70	6.82
507 1900 L	Jamali, Gaya, red, soft	13.40	1.71	8.87	71.69	2.39	1.80	0.14	1.55	1.42	8.5
513 1900 L	"Champururi," Gaya, red, soft	12.77	1.98	11.00	69.27	2.15	2.36	0.47	1.89	1.56	6.61
516 1900 L	"Naubia," Arariah, red, hard	12.64	1.21	10.50	70.58	2.67	2.10	0.21	1.81	1.68	6.19
645 1902	Wheat . . .	13.07	1.80	13.50*	60.05	2.19		2.49	2.16	..	3.25
296 1903	Cawnpore . . .	12.89	1.75	8.44	73.75	1.52	1.48	0.19	1.41	1.35	9.21
312 1903	Do. . . .	14.21	1.75	7.13	73.41	1.59	1.69	0.19	1.23	1.11	10.56
<i>Flour</i>											
647 1902	Wheat flour . . .	13.17	1.40	13.50*	68.23	1.20	2.50		2.16	..	3.09
389 1909	Lucknow . . .	10.77	2.21	14.29	67.50	2.28	2.66	0.20	2.60	2.20	3.08
173 1910	Military Dairy, Lucknow.	10.95	2.57	9.38	73.31	1.83	1.83	0.13	1.80	1.50	8.44
<i>Flour mill waste</i>											
25 1908	Ambala . . .	11.35	4.62	13.21	54.57	11.00	3.87	2.38	2.14	1.96	2.91
64 1911	Military Farm, Agra	7.93	2.23	7.98	67.59	9.82	2.74	1.37	1.54	1.28	9.15
65 1911	Do. do.	8.06	5.06	11.22	68.70	4.17	2.45	0.31	2.06	1.80	7.16
48 1912	Do. do.	9.85	2.61	12.00	68.25	3.63	2.47	1.10	1.98	1.92	6.19
47 1912	Do. do.	9.32	2.36	9.54	69.35	8.29	2.77	1.46	1.71	1.53	7.32

TRITICUM VULGARE, Vahl.—contd.

English.—Wheat.*Vernacular.*—Gehum.

Description of samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
<i>Wheat product.</i>											
Dust, Ruk	7.27	1.71	4.83	50.29	14.71	7.78	13.41	0.89	0.77	11.23	00.7
Do. Quetta	7.59	1.63	4.66	49.60	14.65	7.71	14.16	0.81	0.75	11.45	05.3
Ground, Quetta	10.07	2.40	11.24	68.92	3.84	2.58	0.95	1.99	1.80	6.62	103.0
Dalia, Quetta	9.39	2.97	10.37	66.25	3.06	3.44	2.62	1.85	1.69	0.01	100.1
Thin, Jubulpore	7.89	0.45	10.37	37.79	3.51	10.26	20.73	1.83	1.60	5.74	87.3
Stub, Ambala	10.76	1.90	8.22	64.01	0.13	3.04	2.23	1.43	1.32	8.99	89.9
Do. Lahore*	6.37	2.02	6.02	44.08	12.40	5.01	22.87	1.15	1.01	7.71	64.9
Dust, Ambala	9.01	1.39	6.44	53.53	12.59	5.28	11.73	1.13	1.03	8.81	73.1
Do. Lahore	9.80	1.01	6.57	54.34	14.82	5.27	8.19	1.20	1.05	8.42	73.3
Tolland, Lahore	10.95	3.30	11.01	66.83	4.38	3.32	0.21	1.93	1.70	6.70	102.6
Fine pollard, Ambala	12.61	3.37	10.42	68.74	2.32	2.37	0.17	1.99	1.67	7.34	102.1
<i>Bran</i>											
Dhara Dan	12.03	4.94	7.56	63.73	5.47	3.14	0.18	1.45	1.21	10.20	97.0
Poona	11.88	4.19	10.90*	58.66	9.37	4.58	0.44	1.74	..	0.27	96.4
Roller mills, Bombay	13.44	3.07	10.30	56.58	10.83	5.36	0.42	1.82	1.65	6.18	90.0
Hand chakry, Bombay	12.96	2.34	16.10	57.40	7.20	3.69	0.40	2.78	2.37	3.00	103.5
Dana, Kirkee	9.07	4.11	11.93	62.22	6.32	4.80	1.53	2.03	1.91	6.60	102.3
Do. Aden	8.33	4.04	11.61	63.20	7.58	5.09	0.15	2.05	1.86	6.24	102.3
Do. Ruk	9.56	4.65	12.87	60.47	6.89	5.32	0.24	2.23	2.06	5.53	104.3

TRITICUM VULGARE, *Vill.*—contd.*English.*—Wheat.*Vernacular.*—Gehum.

Laboratory No.	Description of Sample.	% Moisture	% Fiber extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
<i>Bran—conc'd.</i>											
294 1014	Barn Quetta . . .	10.08	4.52	13.97	59.64	7.16	4.67	0.21	2.40	2.28	4.0
306 1014	Do. Bangalore . . .	9.13	3.78	12.87	63.46	6.19	4.38	0.19	2.32	2.06	5.1
309 1014	Do. Mhow . . .	9.22	3.74	11.33	60.84	8.63	4.08	1.77	1.92	1.86	6.0
316 1014	Do. Belgaum . . .	10.82	3.17	11.39	61.69	8.12	4.64	0.17	2.02	1.82	6.1
319 1014	Do. Jubbulpore . . .	10.83	3.97	12.14	60.61	7.98	4.24	0.23	2.08	1.94	5.7
15 1015	Do. Karnal . . .	10.09	2.48	8.72	64.15	9.37	4.10	1.09	1.47	1.39	5.4
17 1015	Do. Ambala . . .	10.88	4.12	11.63	60.72	7.43	4.54	0.73	2.03	1.86	6.0
18 1015	Do. Allahabad . . .	10.28	3.81	13.02	60.85	8.28	4.59	0.17	2.07	1.92	5.6
<i>Straw</i>											
355 L 1895	Gursikran . . .	7.61	..	3.04	35.33	45.93	3.34	4.75	0.65	0.40	11.62
443 L 1900	Cawnpore . . .	9.53	0.74	2.44	40.19	35.13	4.47	7.20	0.53	0.36	17.0
498 L 1900	Dudhla, Palna . . .	9.20	0.99	3.75	37.98	31.68	4.15	12.25	0.71	0.60	10.4
308 L 1900	Jamati, Gaya . . .	9.15	1.32	3.32	37.17	30.51	4.69	13.80	0.59	0.53	12.0
514 L 1900	Champurahi, Gaya . . .	8.17	1.06	3.88	37.12	30.80	4.36	15.11	0.67	0.54	11.6
517 L 1900	Naubia, Arariah . . .	8.06	0.89	2.13	39.81	33.78	3.82	6.60	0.37	0.34	10.2
365 1902	Pasi wheat straw . . .	8.56	1.46	2.75	45.07	28.38	5.04	8.74	0.51	0.44	11.6
460 1902	Wheat straw . . .	9.85	1.60	3.12	49.80	24.89	2.98	7.46	0.49	0.49	11.2
379 1903	Cawnpore . . .	10.74	1.14	1.44	47.06	27.23	3.00	9.39	0.34	0.23	14.6
313 1903	Do. . .	10.40	1.49	2.62	37.87	19.18	4.76	23.08	0.48	0.42	13.7

COMPOSITION OF SOME INDIAN FEEDING STUFFS

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TRITICUM VULGARE, Vill.—concl'd.

English.—Wheat.*Vernacular.*—Gehum.

Description of sample	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrate	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albumenoid nitrogen	Albumenoid ratio	Feed units
				<i>Straw—concl'd.</i>							
Cannore . .	11.75	1.55	3.37	40.22	22.40	5.08	13.03	0.55	0.54	13.00	51.5
Do. . .	12.27	1.25	2.00	41.86	23.76	3.09	11.87	0.41	0.32	23.86	53.0
				<i>Green fodder.</i>							
Punjab . .	82.05	0.40	1.87	7.56	5.07	1.52	0.93	0.32	0.30	4.54	13.2
Dysalote . .	10.01	2.07	9.70	39.24	26.31	7.84	4.83	1.66	1.56	4.54	68.7

VICIA SATIVA, Linn.

English.—Common vetch, Tare.*Vernacular.*—Akta.

	<i>Grain</i>										
Akta, Pusa . .	9.08	1.06	25.74	54.06	5.73	3.19	0.15	4.65	4.12	2.25	122.0

VIGNA CATJANG, Walp.

English.—Cow pea.*Vernacular.*—Lobia, Chavli, Barbati.

	<i>Grain</i>										
Ponza . . .	7.26	1.35	20.13	63.30	4.07	3.41	0.48	3.68	3.22	3.30	117.0
Rawan, Punjab . .	10.45	1.42	16.81	65.31	2.33	3.58	0.10	2.72	2.69	4.08	110.0

*ZEA MAYS, Linn.**English.*—Maize, Indian corn.*Vernacular.*—Makai, Bhutta.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	% Amino acid nitrogen
<i>Grain</i>											
40 1900 L	Maize grain (white), Punjab	11.63	4.53	8.25	72.03	1.16	1.95	0.25	1.42	1.32	0.99
41 1900 L	Maize grain (orange), Punjab	11.88	4.49	7.37	72.68	1.03	2.45	0.10	1.27	1.18	11.25
410 1900 L	Maize grain, local (yellow), Cawnpore	10.54	4.73	0.38	72.53	1.43	1.34	0.05	1.57	1.51	8.66
411 1900 L	Maize grain, "Jaunpore" (white), Cawnpore	8.04	5.13	0.32	74.33	1.53	1.60	0.05	1.53	1.40	0.24
412 1900 L	Maize grain "King Philip," (large, red, imported), Cawnpore	10.73	4.22	11.62	70.29	1.46	1.59	0.10	1.88	1.86	6.90
413 1900 L	Maize grain, Early American, (large, white, imported), Cawnpore	11.02	4.29	0.57	72.20	1.33	1.39	0.20	1.62	1.53	8.53
414 1900 L	Maize grain extra early large, orange imported, Cawnpore	10.50	4.60	9.69	71.96	1.43	1.54	0.10	1.63	1.56	8.54
415 1900 L	"Sweet Corn," (Large white, imported), Cawnpore	9.94	6.42	12.07	66.81	2.06	2.25	0.45	2.04	1.93	6.76
310 1914	Maize grain, Mhow	10.06	3.98	7.58	73.82	1.03	1.63	0.30	1.24	1.21	11.08
<i>Maize flour</i>											
621 1902	Maize flour (home made)	13.23	2.19	9.12*	71.61	1.29	1.54		1.46	..	8.66
<i>Green fodder</i>											
582 1900 L	Maize plant (fresh), Punjab	88.92	0.31	1.13	4.65	3.11	1.04	0.84	0.24	0.19	4.74
	Maize plant, dry state	10.04	2.32	9.17	37.76	25.25	8.44	6.82	1.95	1.51	4.65

*ZINGIBER OFFICINALE, Roscoe.**English.*—Ginger.*Vernacular.*—Adi, Ada, Adrak, Sunti.

54 1911	Ginger, Jamaica	85.37	1.99	1.91*	8.12	1.00	1.61	0.00	0.31	..	6.65
55 1911	Do. Cochín	87.38	1.63	1.59*	7.11	0.88	1.41	0.00	0.25	..	8.01
56 1911	Do. Calicut	87.74	1.32	1.37*	7.28	0.92	1.37	0.00	0.22	..	7.53
57 1911	Do. Country	85.47	1.46	1.80*	8.74	0.95	1.58	0.00	0.29	..	6.78

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